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The Psychology of Suggestion and Heightened Suggestibility

Balaganesh Gandhi

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Department of Psychology

University College London

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

Abstract

Hypnosis is associated with profound changes in conscious thought, experience and behaviour and has a long clinical and experimental history. Data on the nature and role of hypnotic induction procedures is still somewhat lacking however, and probably the only thing one can say about them with any conviction is that they enhance suggestibility in some cases. Nevertheless, a review and re-analyses of previous work reveals that the effect of the induction of hypnosis on suggestibility may be substantial, comparable to psychological treatments in general. The work reported here makes a clear distinction between the hypothetical 'hypnotic state' and the phenomena produced by suggestion and aimed to investigate the necessity for the former in producing suggestibility changes and the mechanisms by which both exert their influence. As it had important implications for how non-hypnotic and hypnotic suggestibility were measured in the thesis, Study 1 (n=312) examined the relationship between lateral asymmetry and bodily response to suggestion. Study 2 (n=102) and Study 3 (n=105) explored the notion that absorption and reduced critical thought are instrumental in how inductions effect responses to test-suggestions and suggestions for pain modulation respectively. Study 4 (n=105) investigated the effect on suggestibility of a hypnotic induction and the extent to which the magnitude of this effect is altered by labelling the procedure 'hypnosis'. Study 5 (n=105) examined the influence of compliance to requests on suggestibility and addressed the role of strategy selection in response to suggestions. The findings are important for both clinical and experimental applications and indicate that important determinants of subsequent responses to suggestion are: (i) the definition of the situation as hypnotic which in turn enhances the expectation of benefits; (ii) the focussing of attention and the reduction of critical thought; and (iii) the facilitation of engaging in goal-directed behaviours through compliance to requests.

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Chapter 1

Suggestion and Suggestibility

Overview of chapters 1-3

It has been hypothesised, in the context of 'hypnosis', that if a suggestion is effectively at work, then a state of hypnosis must be present (e.g. Hilgard, 1965; Orne, 1959, Shor, 1959). However, more recently there has been a tendency amongst researchers not to differentiate between the effects caused by suggestion and those possibly dependent on a hypnotic state. Both are often placed in the category 'hypnosis'. Until the cognitive and neuropsychological mechanisms of both of these potential components have been definitively established, hypnosis and suggestion should be treated separately. The thesis makes a clear distinction between the hypothetical 'hypnotic state' and the phenomena produced by suggestion (Heap & Aravind, 2002). The main focus of this first chapter is suggestion, in particular suggestions that are typically included within the 'domain of hypnosis' (Hilgard, 1991). Hypnosis and the hypothetical 'hypnotic state' will be the main topic of Chapter 2; and in Chapter 3 the effects of hypnosis on responses to suggestion will be reviewed and critically examined.

1.1. The nature of suggestion and suggestibility

Suggestion and suggestibility were once central topics in psychology, with eminent psychologists such as Binet (1900), Bernheim (1911), Freud, (1921), Eysenck (1947), Hull (1933), James (1890), Janet (1889) and Sidis (1898) contributing to our understanding of them. However, in the last 60 years or so there has been a comparative lack of interest in investigating the phenomenon of human suggestibility and as Gheorghiu (1989a) has pointed out, suggestibility has become the 'stepchild' of psychological research.

So what is suggestion and suggestibility? Unfortunately, the task of devising central definitions of these terms has eluded psychology. Gheorghiu (2000) notes that in modern suggestion research – as in the famous articles of Eysenck (1947) and Stukat (1958) – no definitions are actually presented. Bernheim (1884) defined suggestion as a process by which a communication is immediately transformed into the corresponding act, emphasising the involuntary and unconscious nature of responding to suggestions. MacDougall (1908) identified suggestion as a process involving the acceptance of an idea in the absence of critical thought. Some theorists specifically included hypnosis when defining suggestibility, viewing hypnosis as an extreme case of suggestibility (e.g. Bernheim, 1884; Eysenck, 1991; Hull, 1933; Sidis, 1898). Others argue that the terms 'suggestion' and 'suggestibility' are global ones, and hence carry many meanings, which contributes to the confusion surrounding these terms (e.g. Schumaker, 1991b; Gheorghiu, 1989a, 2000). Marcuse (1959) concluded that 'the definitions which are proffered are varied, confusing and incomplete' (p. 85). The generality of suggestion and suggestibility can be illustrated by how these terms are intimately related to a variety of important psychological concepts (Gheorghiu & Kruse, 1991; Eysenck, 1991), such as conformity, compliance, the placebo response, hypnotic phenomena, influence, expectancy and imitation. It is clear that suggestibility is a complex phenomenon, and is unlikely to represent a monolithic construct (Schumaker, 1991b), however, the fundamental aspects of suggestion and suggestibility remain to be elucidated. The lack of standardised psychological tests available for measuring individual levels of suggestibility independently of hypnosis has resulted in the mainstay of the literature being primarily in connection with hypnosis. Nevertheless, as indicated by this brief overview, suggestibility clearly has meaning independent of hypnosis, and it is with the non-hypnotic context that this chapter will initially be concerned with.

1.2. Suggestibility independent of hypnosis

Experimental work on suggestibility independent of the hypnotic context dates back to the nineteenth century (e.g. Binet, 1900; Gilbert, 1894; Seashore, 1895; Sidis, 1898). Although

the manifestation and nature of 'suggestion' in psychological literature has primarily been in connection with hypnosis, the focus of this section will be non-hypnotic suggestibility, sometimes referred to as 'waking'[1] suggestibility (e.g. Bernheim, 1884; Hull, 1933)

Research on suggestion independent of hypnosis carried out by pioneers such as Binet, Seashore and Sidis, was primarily concerned with whether 'normal suggestibility' in the 'normal' population actually existed and whether it could be empirically tested (Gheorghiu, 1989a). This led to the development of suggestibility tests outside the hypnotic context, where participants were tested indirectly, without any awareness that their perceptions and judgements were being influenced. Binet's (1900) progressive lines and weights tests are the most well known examples of these indirect tests of suggestibility. The progressive lines test involves participants being briefly shown a line of a particular length, which is then removed and replaced by a series of other lines. The first few lines are longer than the preceding one, but subsequent lines are of equal length.

Participants are required to judge whether the line is 'longer', 'shorter' or 'equal'. The progressive weights test is similar in nature, involving the judgement of weights rather than line length (Weitzenhoffer, 2000). Hull (1933) classified these tasks as tests of *impersonal suggestion.* In contrast Hull identified more explicit tests of suggestibility involving communications that suggested effects were occurring, as tests of *personal suggestion.* One of the oldest and best known examples of an 'explicit' test of suggestibility is the postural sway test, which involves participants standing with their eyes closed and being told repeatedly that they will experience a backward movement, then a tendency to sway backward and then a tendency to fall. Another classic example is the Chevreul pendulum test, which involves suspending a pendulum above the ground whilst the person holding it up is given the suggestion that the pendulum is beginning to sway. This classification of personal and impersonal tests of suggestibility, are also designated as direct and indirect procedures or

[1] The term 'waking' when used to distinguish suggestibility from hypnotic suggestibility is a misnomer as hypnosis is unrelated to sleep (Braffman & Kirsch, 1999)

prestige and non-prestige measures by many researchers (e.g. Aveling & Hargreaves, 1921; Binet, 1900; Bird, 1940; Lurie, 1938)

A few years later Eysenck and Furneaux (1945) in their influential study, made distinctions similar to these earlier conceptions (Gwynn & Spanos, 1996). Eysenck and Furneaux (1945) administered 12 tests of suggestibility to sixty neurotic male army patients of average intelligence. Using factorial analysis they identified two types of suggestibility: 'primary' and 'secondary'. Primary suggestibility involved participants' behavioural and experiential involuntary responses to direct verbal suggestions. Eysenck and Furneaux (1945) found the various measures of primary suggestibility, which include the postural sway and Chevreul pendulum tests, to correlate highly with hypnotizability and phenomena associated with hypnosis. Secondary suggestibility is rather a vague category and was said to involve suggestibility of the indirect kind, as measured by Binet's (1900) progressive lines and weights tests. Eysenck and Furneaux indicated that secondary suggestibility might be closely associated to various tendencies otherwise known as 'gullibility'. In contrast to primary suggestibility, secondary suggestibility did not correlate with hypnotizability.

Subsequent studies have attempted to verify Eysenck-Furneaux's important classification of 'primary' and 'secondary' suggestibility, and in the main the findings appear mixed and inconclusive. In one of the earliest studies, Grimes (1948) administered 16 tests judged to be 'valid measures of suggestibility' to 233 orphan boys, between 8 to 15 years of age. Grimes found that the correlations between the tests of suggestibility were for the most part very low, some being positive and others negative, although there was some evidence for a primary suggestibility factor (Gheorghiu 1989a, Gwynn & Spanos, 1996). Benton and Bandura (1953) aimed to corroborate the findings of Eysenck and Furneaux using a 'normal' (rather than 'abnormal') population of 50 undergraduate students. However, their results appeared to indicate that the Eysenck-Furneaux conclusions did not apply to a group of normal young adults, with mostly non-significant correlations between tests of suggestibility.

Stukat (1958) carried out a comprehensive factorial and experimental analysis of suggestibility with samples of Swedish children and adults and found factors consistent with Eysenck-Furneaux's classification of primary suggestibility. Stukat (1958) also found factors consistent with secondary suggestibility, and claimed that secondary suggestibility involved the effect of subjective factors, such as conformity and expectation, on cognitive functions, such as perception and memory (Gheorghiu 1989a, Gwynn & Spanos, 1996). This interpretation reflected the earlier developments of Binet (1900) who posited that there was a relationship between responsiveness to suggestion and: (a) obedience to mental influence emanating from another person; (b) imitation; (c) susceptibility to preconceived ideas, inhibiting the faculty of criticism; and (d) expectative attention (Gheorghiu 1989a, Gwynn & Spanos, 1996). Stukat's conformity factor corresponds closely to (a) and (b), whilst Stukat's expectation factor corresponds to (c) and (d) (Gwynn & Spanos, 1996). Primary suggestibility was found to be uncorrelated with age, whereas secondary suggestibility was found to be negatively correlated with increasing age. In addition, neurotics, tended to be more suggestible participants on tests of secondary suggestibility only.

Duke (1964) carried out a review of the intercorrelational status of suggestibility tests up to the early 1960's. He found the correlations between primary suggestibility tests from all research he reviewed to be moderately high ($r = 0.46$) providing support for a factor of primary suggestibility. Primary suggestibility tests were also found to provide an adequate measure of hypnotizability (correlation with hypnosis: $r = 0.60$). Secondary suggestibility measures were found to have low intercorrelations ($r = 0.14$). Duke (1964) further classified secondary suggestibility into 4 sub-categories: (i) 'task set' which were associated with Binet's (1900) progressive weights and lines tests; (ii) 'sensory' which were related to tests of heat and odour illusions; (iii) 'conformity'; and (iv) standard geometric illusion tests. Of the 4 sub-categories of secondary suggestibility tests, there was a very low correlations between sensory and conformity classes and primary tests (approximately $r = 0.10$). Task set tests failed to correlate with primary tests, but did exhibit a very low correlation with sensory and conformity tests (approximately $r = 0.10$). Standard illusion tests failed to correlate among

themselves or with other categories of suggestibility test. Overall Duke's results indicate a lack of empirical support for the concept of secondary suggestibility.

Evans (1967) evaluated the earlier evidence and attempted to classify and account more precisely for suggestibility observed in 'normal' participants. In particular, Evans claimed that factor analytic studies (e.g. Duke, 1964; Hammer, Evans & Bartlett, 1963; Stukat, 1958) do not confirm the classification of primary and secondary suggestibility as identified by Eysenck and Furneaux (1945). He posited that these studies identify at least 3 types of suggestibility: primary, challenge and imagery/sensory suggestibility. Evans' primary suggestibility factor was synonymous with that described by Eysenck and Furneaux (1945), as measured by body sway and Chevreul pendulum tests. Challenge suggestibility was characterised by suggestions for example for arm rigidity and immobility, which suggest that individuals cannot carry out a certain action (e.g. move their arm), and then challenging them to overcome the induced phenomenon. Imagery or sensory suggestibility was closely associated with heat and odour illusion tests and involved an uncritical acceptance of suggested situations (Evans, 1967; Gwynn & Spanos, 1996).

In summary, the findings concerning non-hypnotic suggestibility (suggestibility independent of hypnosis) are at best inconclusive and beset with equivocal results and conceptual difficulties. The only clear conclusion that emerges from the literature is that suggestibility is not a unitary dimension (e.g. Evans, 1967; Eysenck, 1947; Gheorghiu, 1989a; Stukat, 1958; Weitzenhoffer, 2000). Gheorghiu (1989a) points out that classification of suggestibility has been so firmly entrenched with procedures, at the expense of any additional explanation at all. In others words research has been pre-occupied with 'how' a suggestion procedure is implemented, rather than 'what' is suggested. For example, Eysenck and Furneaux's original and influential categorisations associated primary suggestibility with "motor" activities and a 'direct' suggestion mode (e.g. body-sway test; Chevreul pendulum). Whilst in contrast, secondary suggestibility was connected with 'sensory' activities and an 'indirect' suggestion mode (e.g. heat illusion test). Consequently, direct and

indirect tests often differed on 'how' something was suggested as well as 'what' was suggested (Gheorghiu, Polczyk & Kappeller 2003). However, motor and sensory processes can be influenced by both 'direct' and 'indirect' suggestions, emphasising the importance of the way in which the influence of suggestion actually exerts its effect as opposed to the procedural method (e.g. Hammer et al., 1963 Stukat, 1958). Similarly indirect suggestions are often cited as being a 'permissive' mode, with direct suggestion being an 'authoritative' mode. However, direct suggestive influence can be achieved in a permissive, non-authoritative way (Gheorghiu, 1989a). Gheorghiu (1989a) claims one-sided connections, such as those made by Eysenck and Furneaux (i.e. direct suggestion mode with motor processes and indirect suggestion mode with sensory processes) have resulted in classifications that are far too sweeping, based on differences that may not all be equally meaningful.

Another key shortcoming of research on suggestibility is the lack of standardisation of tests for the measurement of suggestibility. Even with the best-known tests such as the body-sway and Chevreul pendulum tests, which were first used in the nineteenth century, there are no established or general methods for implementing them. Consequently the same tests may differ in relation to: the condition and context the tests are administered in; the instructions and explanations given to participants; the time available to complete the tests; the sequence the test items are received; and the method used to score test items (Gheorghiu et al., 2003). The contradictory and ambiguous results evident in the literature may be due in part to the lack of standardised tests and deficiencies in the procedures used to implement them (Gheorghiu, 1989a).

Investigations in this area are rare, and research on suggestion and suggestibility after reaching a peak in the late nineteenth and early twentieth century with Binet, Eysenck and Hull to name but a few, almost disappeared from psychology completely. In the last 30 years there has been a resurgence of interest in suggestion. The terms 'suggestion' and 'suggestibility' have gained the attention of many researchers, however this has almost been

exclusively in the context of the areas of: hypnosis, social influence, placebos, and memory distortions induced by means of suggestive techniques[2] (Gheorghiu, et al., 2003). Entire books and a multitude of articles have been devoted to the role of suggestion in these areas and therefore would be too large to comprehensively examine here (for excellent reviews of contemporary suggestion and suggestibility research and theory, see the edited books by De Pascalis, Gheorghiu, Sheehan & Kirsch, 2000; Gheorghiu, Netter, Eysenck & Rosenthal, 1989; Schumaker, 1991a). In light of this, the focus of the thesis, and the paucity of research on the fundamental aspects of suggestibility independent of hypnosis, the discussion will now turn to the literature on suggestion and suggestibility within the 'domain of hypnosis' and the relationship between hypnotic responsiveness and (i) social influence; (ii) placebo effects; and (iii) interrogative suggestibility.

1.3. Suggestion and suggestibility within the domain of hypnosis

In 1973 Hilgard characterised the 'domain of hypnosis' by the kinds of behaviours and experiences reported in hypnosis. Hypnotic phenomena such as analgesia, motor inhibitions, amnesia, and hallucinations were seen as central to a definition of hypnosis. Hilgard (1973, 1991) claimed that certain forms of suggestibility are associated with hypnosis and others lie outside the domain of hypnosis. He characterised suggestion as a 'form of communication that produces a compliant response that differs in its subjective aspects from a deliberate response to a request' (1991, p. 38). Specifically, Hilgard argued that 'primary suggestibility' is closely related to hypnosis; whilst 'secondary suggestibility' characterised by forms of social suggestibility, such as gullibility, conformity, and compliance are unrelated to hypnotic behaviour. In the main, the 'domain of hypnosis' is

[2] The suggestion associated with social influence, placebos, and memory distortions induced by means of suggestive techniques, *could be* classified as types of non-hypnotic suggestibility. This chapter distinguishes these possible forms of non-hypnotic suggestibility from the literature on suggestibility independent of hypnosis, which is reviewed in section 1.2, and is based on classical tests for measuring suggestibility (e.g. body-sway and Chevreul pendulum tests).

largely defined by the standardised scales that are used to measure hypnotizability[3], such as the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962) and the Carleton University Responsiveness to Suggestion Scale (CURSS: Spanos, Radtke, Hodgins, Stam & Bertand, 1983). These scales, which typically comprise of a hypnotic induction ritual and a series of test suggestions, are central to the thrust of the thesis and will be examined thoroughly later on in the chapter (section 1.7). But now the relationship between hypnotic suggestibility and other forms of suggestibility will be considered.

1.4. Hypnotic suggestibility and social influence

As discussed earlier, Eysenck and Furneaux (1945) found hypnotizability correlated with primary suggestibility, involving direct tests, but not with secondary suggestibility, which involved more indirect tests. Similarly, Hull (1933) and Evans (1967) found a positive correlation between responses to direct non-hypnotic suggestions (i.e. primary suggestibility) and hypnotizability. In a widely cited study by Moore (1964), the relationship between hypnotic suggestibility and social suggestibility was investigated in 80 male participants. Social influence was measured using a persuasibility test (Hovland & Janis, 1959); an influencibility test (Schachter, 1959) and an autokinetic test (Sherif, 1935). Hypnotic suggestibility was measured by the Stanford Hypnotic Susceptibility Scale, Form A (SHSS:A; Weitzenhoffer & Hilgard, 1959). Factor analysis appeared to show that the hypnotic scale and sub-scales represented one factor (primary suggestibility), which was orthogonal to a bipolar factor represented largely by scores on the tests of social influence. The correlations revealed that hypnotic suggestibility was marginally negatively related to persuasibility (r = -0.17, $p < 0.10$), moderately positively correlated with influencibility (r =

[3] The term 'hypnotizability' will sometimes be used for convenience. Strictly speaking hypnotizability is the *change* in responsiveness to 'hypnotic' suggestions produced by the induction of hypnosis (Kirsch, 1997). However, hypnotizability in the context of this chapter refers to the measurement of responsiveness to 'hypnotic' suggestions following the administration of a hypnotic induction – i.e. hypnotic suggestibility (see section 1.8)

0.21, $p < 0.05$) and uncorrelated with the autokinetic test. Moore suggested that the moderate relationship between influencibility and hypnotic suggestibility might be accounted, in part, by the inclusion of the postural sway suggestion in the total hypnotic suggestibility score. Moore (1964) came to a similar conclusion to that of Hilgard, and proposed that hypnotizability tapped into 'primary' suggestibility, whilst tests of social suggestibility were related to conceptions of 'secondary' suggestibility, and that both were independent of one another.

In contrast, Shames (1981) reported a strong relationship ($r = 0.55$, $p < 0.05$) between hypnotic suggestibility, as measured by the Hypnotic Induction Profile (HIP: Spiegel & Spiegel, 1978) and conformity, determined by means of the classic Asch paradigm (1952, 1956). Shames hypothesised that suggestibility was the construct mediating the correlation between these two phenomena. However, this strong relationship was based on only 10 participants, and it is still yet to be determined whether this relationship would remain if investigated using a more substantial sample. Another weakness undermining these results is the use of the Hypnotic Induction Profile as measure of hypnotic suggestibility. A number of studies have failed to support a relationship between the HIP and conventional suggestion-based tests of hypnotic responsiveness such as the Stanford scales (e.g. Sheehan, Latta, Regina & Smith, 1979; Orne, Hilgard, Spiegel, Spiegel, Crawford, Evans, Orne, & Frischholz, 1979).

Several studies have found that higher levels of hypnotic suggestibility may be associated with greater responsiveness to social influence. Miller (1980) examined the relationship between the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A; Shor and Orne, 1962) and the Suggested Syllables test, which was deemed to be a behavioural measure of non-hypnotic suggestibility. The Suggested Syllables test requires participants to determine the identity of tachistoscopically presented 'nonsense' syllables when, unknown to them, no syllables were present. Miller found that low hypnotically suggestible participants perceived the suggested syllables significantly less frequently than both high and

medium hypnotically suggestible participants. Council and Loge (1988) similarly found a significant difference between high and low hypnotically suggestible participants who received instructions implying that they would perceive increases in odour or heaviness. Greater hypnotic suggestibility was found to be associated with more perceived changes in odour and heaviness and greater confidence in reports. However, Council and Loge found no differences between hypnotic and non-hypnotic contexts, and concluded that their results supported a 'general factor underlying suggestibility in hypnotic and non-hypnotic situations' (p. 95).

Malott, Bourg and Crawford (1989) assessed the impact of a hypnotic induction and hypnotic suggestibility on the responses of 48 undergraduates to a persuasive communication advocating mandatory pregraduation comprehensive examinations. Malott et al., (1989) found that participants in the hypnotic context (following a hypnotic induction) generated significantly fewer counter-arguments to the presentation, than participants in the non-hypnotic context (absence of hypnotic induction). No differences with respect to counter-arguing were found between high and low hypnotically suggestible participants. However, high hypnotically suggestible participants, in both contexts, were significantly more likely than low hypnotically suggestible participants, to agree and be in favour of the arguments presented in the communication. Malott et al., (1989) concluded that 'both context (induction) and trait (hypnotic suggestibility level) played a role in the occurrence of hypnotic behaviour' (p. 31). Graham and Greene (1981) also found a similar relationship between response to persuasive communication and hypnotic responsiveness.

In short, the findings with respect to the relationship between hypnotic responsiveness and social influence are highly inconsistent. Some studies indicate that higher levels of hypnotic responsiveness may be associated with greater responsiveness to social influence (e.g. Shames, 1981; Malott et al., 1989); whilst others have found them to be independent of one another (e.g. Eysenck & Furneaux, 1945; Moore, 1964). The relationship between the two is further complicated by the findings that measures of susceptibility to social influence,

including, Hovland and Janis' (1959) persuasibility test, Schachter's (1959) influencibility test, and Sherif's (1935) autokinetic test, do not correlate with each other (see Moore, 1964). It is not clear at all whether responses to social influence are distinct from hypnotizability.

1.5. Hypnotic suggestibility and the placebo response

The literature regarding the relationship between hypnotic and placebo responsiveness is also less than definitive, partly due to a lack of research and lack of conceptual clarity in this area. It is generally agreed that placebo effects are due to a variety of psychological processes, including patient's belief in the efficacy of the treatment, response expectancies, and aspects of the patient-doctor relationship (e.g. Lundh, 1987, 2000; Wagstaff, 1981). Lundh (2000) defines placebo effects as 'psychologically mediated effects that are due either to the patient's belief in the efficacy of the treatment, or to other aspects of the therapeutic relationship' (p. 72). The deceptive nature of placebos makes phenomena in response to placebos similar to Eysenck and Furneaux's category of 'secondary suggestibility' (Kirsch, 2000b). The classic study of McGlashan, Evans and Orne (1969) is frequently cited as providing evidence that suggestions involved in placebos are not the same as hypnotic responsiveness (see also Evans, 1981, 1989; Hilgard & Hilgard, 1983; Orne, 1974; Shapiro, 1971). The study compared hypnosis to placebo medication (a placebo packed in Darvon capsules) in the relief of ischemic muscle pain. They reported that high hypnotically suggestible participants showed substantial pain reduction in response to hypnotic analgesia and only a slight pain decrease in the placebo condition. In contrast, low hypnotically suggestible participants showed a mild pain reduction in both the hypnotic analgesia and placebo conditions. Placebo response did not differ significantly between high and low hypnotically suggestible participants. They concluded that the mechanisms underlying hypnotic responses are distinguishable from those involved in responses to placebos. Spanos, Perlini and Robertson (1989) similarly found that high hypnotically suggestible participants showed significantly greater pain reduction in hypnosis as compared to both baseline and placebo conditions,

despite using a different pain stimulus (a strain gauge on a finger) and a different placebo ('topical anaesthetic') to that used in the McGlashan et al., (1969) study.

The evidence appears to indicate that hypnotic responsiveness is independent of placebo responsiveness. However, there are several problems relating to these laboratory studies comparing placebo and hypnotic analgesia. Primarily, the parameters of experimental and clinical pain do not overlap in several areas (Melzack, 1973). Evans (1974) indicates that analgesic placebos are about twice as effective in clinical trials as in experimental trials. Kirsch (2000b) highlights another potential flaw in studies comparing hypnosis and placebo effects, noting that placebo controlled investigations require that the placebo match the treatment for which it is a control for, as different placebos potentially have different effects. Indeed, in a recent review of placebo effects Kirsch (2002) cites studies showing that: placebo injections are more effective than placebo pills (de Craen, Tijssen, de Gans, Kleijnen, 2000); placebo morphine is more effective than placebo aspirin (Evans, 1974); red placebos are more effective than white, blue or green placebos (de Craen, Roos, de Vries, Kleijnen, 1996; Huskisson, 1974; Nagao, Komia, Kuroanagai, Minaba & Susa, 1968); placebos are more effective when associated with a well-known brand; and that the placebo response varies as a function of 'dose' consumed (Branthwaite & Cooper, 1981)

Kirsch (2000b) argues that given the differing effects of different placebos it is possible that high hypnotically suggestible individuals who are able to experience phenomena such as hallucinations, analgesia and amnesia, would consequently expect greater pain relief from hypnosis than a placebo packed in Darvon capsules or described as a 'topical anaesthetic'. In this context he refers to a study (Baker & Kirsch, 1993), which found that placebo and hypnosis were equally effective in reducing pain, when the placebo was presented as a drug that induced hypnosis. It is evident that that relationship between hypnotic and placebo responsiveness is not as conclusive as is commonly believed. Nevertheless, linking hypnotic responsiveness to the placebo response may have detrimental consequences for the use of hypnotic suggestions as an adjunct to psychological and medical treatments. As Kihlstrom

(2001) points out, the current healthcare environment perceives placebos negatively, rather than as a psychological phenomenon that could be utilised for positive effect. Future research will need to carry out comprehensive analyses and multivariate studies to elucidate the relationship between hypnotic and placebo responsiveness.

1.6. Hypnotic suggestibility and interrogative suggestibility

Interrogative suggestibility is one of the few areas, independent of hypnosis, that has produced an extensive and productive line of research inextricably linked with the concept of suggestion. Schooler and Loftus (1986) identify two main theoretical approaches to interrogative suggestibility: 1) the 'experimental' approach as typified by the work of Loftus and colleagues on the misinformation effect of eyewitness memory (e.g. Loftus, 1975, 1979; Loftus, Miller & Burns, 1978); and 2) the 'individual differences' approach as illustrated by the work of Gudjonsson on individual differences in susceptibility to leading questions and responses to negative feedback (e.g. Gudjonsson, 1983, 1984, 1992, 2003; Gudjonsson & Clark, 1986) . Although the two approaches are complementary to each other (Gudjonsson, 1992), the measurement of suggestibility is central to the work of Gudjonsson, and consequently emphasis will be placed on the 'individual differences' approach.

Gudjonsson and Clark (1986) define interrogative suggestibility as 'the extent to which, within a closed social interaction, people come to accept messages communicated during formal questioning, as a result of which their subsequent behavioural response is affected' (p. 84). Gudjonsson (1987, 1991) argues that interrogative suggestibility differs from other types of suggestibility in three important ways. Firstly, interrogative suggestibility is concerned with memory and the recollection of past experiences and events. Secondly, interrogative suggestibility is associated with procedures that take place in a closed social interaction (e.g. police questioning). Finally, interrogative suggestibility involves stressful situations, which play upon individuals' level of certainty.

After laying the foundation of the theoretical work (see Gudjonsson & Clarke, 1986), Gudjonsson constructed and developed a scale to measure individual differences in interrogative suggestibility (Gudjonsson Suggestibility Scale: GSS; Gudjonsson, 1984, 1992). The GSS assesses the extent to which participants 'yield' to subtly 'leading questions' and the extent to which participants 'shift' their responses once personal pressure is applied. The GSS has been shown to demonstrate high levels of internal consistency, test-retest reliability and construct validity (e.g. Gudjonsson, 1984; 1992; 2003; Gudjonsson & Lister, 1984; Singh & Gudjonsson, 1984). The GSS is often considered a test of indirect suggestibility, sharing features with secondary suggestibility (Eysenck and Furneaux, 1945), conformity, gullibility and persuasibility. Indeed, the GSS has been found to correlate positively with compliance and acquiescence (e.g. Gudjonsson, 1989; 1990; Richardson & Kelly, 2004) and social desirability (Gudjonsson, 1983; Richardson & Kelly, 2004).

Gudjonsson (1987) argues that there are good theoretical and empirical reasons for construing interrogative suggestibility as a distinct type of suggestibility. Therefore, on conceptual grounds, no relationship would be expected between hypnotizability and interrogative suggestibility. In line with Gudjonsson's hypothesis, in an unpublished undergraduate study, Hardarson (1985; cited in Gudjonsson, 1991) found a non-significant relationship between interrogative suggestibility and hypnotizability as measured by the Harvard Group Scale of Hypnotic Susceptibility (HGSHS:A; Shor & Orne, 1962). Similarly, both Young, Bentall, Slade and Dewey (1987) and David and Brown (2002) reported an absence of correlations between interrogative suggestibility and hypnotizability as measured by the Barber Suggestibility Scale (BSS: Barber, 1965) and the HGSHS:A.

In the first study to explore the relationship between hypnotizability and interrogative suggestibility in the hypnotic setting, Register and Kihlstrom (1988) attempted to induce memory errors by the GSS following a hypnotic induction. Forty participants listened to a short news story and subsequently were required to free recall the details of the story. Four days later, participants were given three free-recall tests: prior to hypnosis, following a

hypnotic induction, and once hypnosis was terminated. During hypnosis participants were interrogated twice, with either 'misleading' or 'objective' questioning for story details. Register and Kihlstrom (1988) found that participants given misleading questions during interrogation gave fewer correct responses, had more factual errors, increased forgetting, and increased *yielding* to interrogative suggestibility, when compared to participants given objective questions. No significant differences in interrogative suggestibility were found between high and low hypnotically suggestible participants. The authors concluded that their results were in 'support of Gudjonsson's (1987) hypothesis that interrogative suggestibility is independent of suggestibility as measured in a hypnotic context' (p. 556).

Nevertheless the relationship between hypnotic and interrogative suggestibility may not be as independent as Gudjonsson hypothesised. Indeed, although Register and Kihlstrom's (1988) study involved both the GSS and a measure of hypnotic responsiveness and despite it often being cited as evidence in support of the independence of hypnotic and interrogative suggestibility, modifications and selective reporting make the assessment of the relationship unclear. Gwynn and Spanos (1996) identified several problems including: (i) the inclusion of 'objective' questioning for half the participants, which was a major digression from the original GSS; (ii) the utilisation of only high and low hypnotically suggestible participants, thus inhibiting any correlational analyses; (iii) the lack of any type of non-hypnotic control group; and 4) failure to report a total interrogative suggestibility score as measured by the GSS.

In contrast to Gudjonsson's hypothesis, Linton and Sheehan (1994) found a significant relationship between interrogative suggestibility and hypnotic suggestibility (as measured by the HGSHS:A; Shor & Orne, 1962) in a sample of 117 college students. They found that suggestibility scores on the GSS differed between high and low hypnotizable participants. They also found that the HGSHS was significantly correlated with yield scores on the interrogative suggestibility scale. A possible explanation for why Linton and Sheehan (1994) found a positive relationship between interrogative suggestibility and hypnotizability may

have been due to a context effect, as both measures were taken during the same session (see Council, Kirsch & Grant, 1996). Supportive of this notion is an unpublished study by Gordon, Gwynn and Spanos (1993; cited in Gwynn & Spanos, 1996), which found that when interrogative and hypnotic suggestibility were measured in different contexts, both were found to be independent of one another. However, when hypnotic procedures were incorporated into GSS testing, a relationship emerged between the two. These findings emphasise the importance of contextually generated expectancies and also indicates that to truly delineate the relationship between interrogative and hypnotic suggestibility, future research will need to assess the levels of hypnotizability and interrogative suggestibility in different sessions, whilst maintaining naivety regarding any connection between the two.

1.7. Measuring 'hypnotic' suggestibility

The previous sections have shown that despite the theoretical and empirical reasons offered by Hilgard (1973, 1991), Eysenck and Furneaux (1945) and Evans (1967, 1989) for construing that hypnosis is only related to 'primary suggestibility', it is evident that evidence pertaining to the independence of hypnosis with respect to social influence, the placebo response and interrogative suggestibility is far from conclusive. Possible explanations for the ambiguity of results in the literature may lie in the lack of available standardised tests and with the varying expectations and beliefs of individuals about the variables on which they are assessed. Theoretical constructs of suggestibility and their inter-relatedness need precise definition and instruments of measurement. The systematic analyses of the dimensions of suggestibility remain on the agenda for future research.

Compared to other forms of suggestibility, there is a substantial literature on 'hypnotic' suggestibility and its measurement. The close association between suggestion and hypnosis led to a preponderance of tests that specifically measure hypnotizability. The measurement of hypnotizability stems back to the nineteenth century and Braid's (1843) proposed three 'stages' of hypnosis. Bernheim (1884) developed these degrees of responsiveness to

hypnosis, and proposed nine categories of responsiveness to suggestion, which were defined in terms of behavioural responses and subjective experiences. Bernheim's 'scale' of hypnotic responsiveness is probably the forerunner of modern hypnotic scales and bears a close resemblance to the current standardised measures of hypnotizability.

Scales used in the measurement of hypnotizability today are standardised to a certain extent, mainly as a consequence of the development of the Stanford scales in the late 1950s and 1960s (Weitzenhoffer & Hilgard, 1959, 1962). Tests of hypnotizability generally comprise of two parts: a hypnotic induction that defines the situation as 'hypnosis' and a series of test suggestions. A typical hypnotic induction consists of instructions for muscular and mental relaxation, focussed attention, and disattention to extraneous thoughts. The four main types of test suggestions that are used are (Kirsch & Braffman, 2001): motor productions (involuntary movements); motor inhibitions (paralyses); cognitive productions (hallucinations); cognitive inhibitions (sensory inhibition, amnesia). Despite this degree of standardisation, there exists a proliferation of measuring instruments. Indeed, Weitzenhoffer (2000) identifies at least 25 instruments described as scales of 'hypnotic susceptibility' and 'hypnotizability'. Are all these scales measuring the same thing? Do they have equivalence? The aim of this section is to examine the uses and limitations of the major scales that have been devised to measure hypnotic behaviour. For a full listing and detailed description of hypnotic suggestibility scales, see Council (2002) and Weitzenhoffer (2000).

1.7.1. The Stanford Scales

Weitzenhoffer and Hilgard (1959) introduced the first of the widely accepted measures of hypnotizability into the field with the Stanford Scales of Hypnotic Susceptibility, Forms A and B (SHSS:A; & SHSS:B), which extensively revised and expanded an earlier scale by Friedlander and Sarbin (1938). These scales begin with a preliminary 'non-hypnotic' suggestion of body sway followed by an induction procedure, which incorporates eye fixation and eye closure. The induction procedure is followed by 10 test suggestions,

including 5 motor challenge items. A major criticism of the first Stanford scales is that although they demonstrated that the field was moving towards a uniform index, they had limited usefulness since the content predominantly consisted of motor items. This resulted in a lack of sensitivity regarding differences amongst the most responsive individuals (Hilgard, 1965). The Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962) was subsequently developed, which consisted of a much wider range of suggestions, including age regression and negative hallucinations, to fully represent the cognitive aspects of hypnosis and the high end of responsiveness (Council, 2002). The SHSS:C also differs from the SHSS:A & B in that items are arranged in ascending order of difficulty, which means that it is not necessary to administer the entire scale to low responders, as the test can be stopped after a number of consecutive item failures.

A number of extensions of the Stanford Scale have been developed for special purposes and populations. One of the first was the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A; Shor & Orne, 1962), which was devised as a group version of the SHSS:A. The HGSHS:A replaces the 'non-hypnotic' suggestion for body sway used in the SHSS:A, by a 'non-hypnotic' suggestion for a head fall. More recently, Bowers (1993, 1998) developed a group version of the SHSS:C, the Waterloo-Stanford Group Scale of Hypnotic Susceptibility, Form C (WSGC). The WSGC attempts to remove the shortcomings of the HGSHS:A, by including a wider ranger of items that tap cognitive as well as positive and negative hallucinations, thus avoiding the exclusive emphasis on motor items found in the HGSHS:A and the SHSS:A. Although group scales have almost identical items as their parent individually administered scales, there is a critical issue surrounding whether group measures can reliably replace individually administered scales. This is discussed in Chapter 3.

In response to the need for a shorter scale for use in clinical work and one with a wider more therapeutically relevant range of items, clinical adaptations of the Stanford Scales for adults (SHCS: Adult; Morgan & Hilgard, 1978-1979a) and for children (SHCS: Child;

Morgan & Hilgard, 1978-1979b) were developed. The clinical adaptations draw on items from A, B and C forms, including hands moving apart, a dream, age regression, post-hypnotic suggestion and post-hypnotic amnesia. The Stanford scales and their derivatives are still seen as the 'gold standard' tools to measure hypnotizability, with the validity of other scales of hypnotizability often established on the basis of how well they correlate with the Stanford scales. The four other measures most commonly utilised in the current practice of both laboratory and clinical hypnosis are the Barber Suggestibility Scale (BSS: Barber, 1965), the Creative Imagination Scale (CIS: Barber & Wilson, 1979), the Carleton University Responsiveness to Suggestion Scale (CURSS: Spanos, Radtke, Hodgins, Stam & Bertrand, 1983) and the Hypnotic Induction Profile (HIP: Spiegel & Spiegel, 1978).

1.7.2. The Barber Suggestibility Scale

The Barber Suggestibility Scale (BSS: Barber, 1965) was first reported in a study by Barber and Glass (1962), and was designed for a series of studies that aimed to delineate the important variables affecting responses to suggestions (e.g. Barber, 1969; Barber & Calverley, 1964, 1965). The BSS contains 8 test suggestions, which can be: (i) defined as a test of imagination or hypnosis; (ii) administered with or without a hypnotic induction; and (iii) used with both adults and children. The BSS is relatively short and can be administered quick and easily. Probably the most significant improvement of the BSS over the Stanford scales is the inclusion of assessment of subjective experiences as well as objective experiences.

1.7.3. The Creative Imagination Scale

The Creative Imagination Scale (CIS: Barber & Wilson, 1979; Wilson & Barber, 1978) is a permissively worded scale and was developed as an alternative to the Stanford and BSS scales which adopted a more authoritarian approach. Like the BSS, the CIS is short and is easily administered and can be administered to an individual or to a group, with or without a hypnotic induction. The CIS contains 10 suggestions in which individuals are invited to

control and generate experiences (rather than being told what to do), such as arm heaviness, music and relaxation, through creative thinking and imagining along with the suggestions. Scoring on the CIS is solely by means of self-report in which participants are asked to rate the reality of their imagined experiences, thus making it especially easy to use in group assessments. As the CIS uses a unique permissive approach, it may particularly useful with individuals who are apprehensive about hypnosis and the loss of control (Council, 2002).

1.7.4. The Carleton University Responsiveness to Suggestion Scale

The Carleton University Responsiveness to Suggestion Scale (CURSS: Spanos et al., 1983) is a group scale that stands in similar relation to the BSS, as the HGSHS:A does to the SHSS:A (Council, 2002). The scale consists of an induction followed by 7 test suggestions. A significantly useful aspect of this scale, is that suggestions are scored on three dimensions: (i) objective, in which the participant assesses their own behavioural response; (ii) subjective, in which the participant rates how real the suggested experiences feel to them; and (iii) involuntariness, in which participants rate the extent to which their objective responses were involuntary. The CURSS has been shown to have strong psychometric characteristics (e.g. Spanos, Radtke, Hodgins, Bertrand, Stam & Dubreuil, 1983; Spanos, Radtke, Hodgins, Bertrand, Stam & Moretti, 1983) and was extensively used by Spanos and colleagues in countless studies (see Spanos, 1996 for an extensive listing of such publications).

1.7.5. The Hypnotic Induction Profile

The Hypnotic Induction Profile (HIP; Spiegel & Spiegel, 1978) is unique among hypnotizability scales in that it was developed in a clinical setting for clinical applications. As a consequence of this it is very short (10 minutes) and fairly easy to administer. The HIP consists of two parts – the eye roll test and the induction. The eye-roll test is probably the most controversial aspect of the HIP, and is measured by the amount of sclera visible between the bottom of the iris and lower eyelid when a person is asked to roll their eyes

upward (Council, 2002). Spiegel and Spiegel (1978) posit that the eye-roll score (ERS) is an index of a person's biological capacity to enter a trance state. The second part of the HIP is the induction, which is a combination of a hypnotic induction and the administration of an arm levitation suggestion. The induction score (INDS) corresponds to the more traditional scales, such as the Stanford (Council 2002). The main issue surrounding the HIP revolves around the debate on how good a substitute the HIP is for other more traditional measures of hypnotic suggestibility. A number of studies have reported the HIP to be an inadequate substitute for the more conventional hypnotic suggestibility scales (e.g. Frischolz, Spiegel, Tryon & Fisher, 1981; Orne et al., 1979; Sheehan et al., 1979). The eye-roll component of the HIP appears to have little to do with hypnotic suggestibility per se and although there is a slight tendency for IND scores to correlate with conventional hypnotic suggestibility measures, the correlations are very low and not sufficient enough to support the notion that it is an adequate measure of hypnotic suggestibility.

1.8. What are 'hypnosis' scales measuring: hypnotizability vs. suggestibility?

Generally, the scales reviewed in the previous section are regarded as hypnosis scales; that is they all claim to measure the extent to which the person is in a hypnotic state, or their capacity/potential to enter or develop a hypnotic state (hypnotizability). The most logical and obvious way to measure and assess hypnosis that has developed has been to sample the kinds of effect 'hypnotized' individuals can produce, i.e. their hypnotic responsiveness. Accordingly, the majority of constructed scales simply consist of sets of test suggestions. Weitzenhoffer (2002) and Kirsch and Braffman (2001) indicate that at best, they are only scales of suggestibility – the capacity to respond to suggestion – with the addition of a hypnotic induction. By this view, they have nothing directly to do with the hypnotic state *per se* (see Chapter 2 for a detailed discussion of the hypnotic state).

It is interesting in this context to note that the current Stanford scale, the SHSS:C, was modified from initial versions (SHSS:A & SHSS:B) to include a number of easier items. The initial SHSS: A & B versions contained 14 hard items, which generated a fairly skewed distribution. Hilgard (1973) included easier items to fit in with his conception that hypnotizability and hypnotic responsiveness had a bimodal distribution, which generated a normally distributed set of response profiles. Consequently, the SHSS:C had an implicit assumption of a bimodal distribution indicative of two kinds of response: - what Hilgard would describe as 'true hypnotic' suggestion which few people pass; and more 'normal suggestion' which are passed by most individuals. Therefore, the SHSS:C and derivative scales have explicit assumption of different types of suggestion incorporated under the domain of hypnosis.

In contrast to the traditional hypnosis scales, there are a small number of other scales designed to measure the depth of hypnosis that do not make direct use of suggestibility (Weitzenhoffer, 2000). Both the Field Inventory (Field, 1965) and the Phenomenology of Consciousness Inventory (PCI: Pekala, 1991a, 1991b) are based on individuals' experiences of being 'hypnotized', with participants retrospectively checking off or rating the degree to which each item on a list of experiences applies to them. However, like most of the other so-called hypnosis scales, the validity of these scales have been established on the basis on how well their measures are correlated with measures of suggestibility obtained from the 'gold standard' Stanford scales. Consequently, the acceptances of these scales that measure the depth of hypnosis have actually depended on their ability to provide a measure of suggestibility (Weitzenhoffer, 2002).

1.8.1. Hypnotic and non-hypnotic suggestibility revisited

On the evidence so far it seems reasonable to conclude that traditional methods for assessing hypnotic responsiveness and hypnotizability generally do not assess the state of hypnosis or the capacity to develop it directly. They seem on the whole to be assessing some

sort of suggestibility, and perhaps only suggestibility. The associations found between hypnotizability as traditionally measured and other variables may therefore simply indicate the extent to which suggestibility itself relates to those measures. In line with this argument, the high correlation, ranging from 0.66 to 0.99, between responsiveness to suggestion with hypnosis and without hypnosis has lead some authors to conclude that what the so-called hypnosis scales are measuring is *Hypnotic Suggestibility* – a measure of suggestibility following the administration of hypnosis (Braffman & Kirsch, 1999; Kirsch & Braffman, 2001). As discussed earlier, suggestibility is a complex phenomenon in its own right (Schumaker, 1991b). There are different types of suggestibility, which differ theoretically and conceptually from one another. Unfortunately as noted above, there are very few available tests of 'non-hypnotic' suggestibility as defined previously.

Kirsch (1997) identifies the type of suggestibility assessed by 'hypnotizability' scales as *imaginative suggestibility* and describes hypnotized participants as engaging in fantasies that 'lead to subjective experiences that are at variance with what they know to be objectively true' (p. 58, Kirsch & Braffman, 2001). Imaginative suggestions are, in Kirsch's view, requests to experience imaginary situations and states of affairs as if they were real. Imaginative suggestions can be given in and out of hypnosis. In fact, most suggestion contained in hypnotic suggestibility scales, explicitly instruct participants to imagine a situation or state of affairs (e.g. 'imagine that your right arm is feeling heavier' or 'imagine that your hands are two pieces of steel welded together'). Specifically what Kirsch is proposing is that there is a general capacity for imaginative suggestibility which can be assessed without a hypnotic induction, when it might be designated as non-hypnotic suggestibility[4]; or following a hypnotic induction procedure, in which case it may be labelled hypnotic suggestibility. This line of thinking may provide a useful insight into what so-called hypnotizability scales are actually measuring and will hopefully lead researchers into

[4] The term 'non-hypnotic suggestibility' is potentially problematic as there are many types of non-hypnotic suggestibility. Non-hypnotic suggestibility in this context is used to denote imaginative suggestibility assessed without a hypnotic induction.

thinking critically about the scales they are using. However, the issue of the scales being doubtful instruments for the determination of the presence of hypnosis or of hypnotizability has received little explicit recognition.

1.8.2. More limitations

A further key limitation of existing scales, with the exception of one (CURSS, Spanos et al., 1983) is the failure to measure whether responses to suggestions are experienced as involuntary ('classic suggestion effect' Weitzenhoffer, 1953) The experience of involuntariness is a defining and characteristic feature of a communication to be termed a suggestion (e.g. Lynn, Rhue & Weekes, 1990; Weitzenhoffer 1953; 2000). Consequently, most scales are open to false-positive scoring, as responses to suggestions may or may not have been experienced as involuntary. Nevertheless, as Weitzenhoffer (2002) points out, provisions for eliciting information regarding experienced involuntariness for each suggestion can be easily made.

Weitzenhoffer (2002) highlights another problem with hypnotic suggestibility scales, regarding the degree of equivalence between scales. The Stanford Scales of Hypnotic Susceptibility (Forms A. B, & C) have served as the 'gold standards' for most other scales of hypnotizability scales. The validity of hypnotizability scales have more often than not been based on how well their measures correlate with: (i) measures obtained from the Stanford scales, or (ii) measures obtained from scales that are seen as adequate substitutes for the Stanford scales. Existing scales are often deemed as equivalent and consequently interchangeable. Statistical correlation values (e.g. Pearson's moment coefficient correlations) are used to provide support and establish the validity of measures of suggestibility in relation to other measures of suggestibility. Weitzenhoffer (2002) identifies that the reasoning for many scales has been that if scale 1 is correlated with scale 2 and if scale 2 correlates with 3, then scale 1 also correlates with 3, which of course is not necessarily so. Moreover, the correlations used to justify equivalence between scales, although

significant, are often relatively small (with *r* values 0.60 and less). So in general we cannot necessarily assume that two scales measure one and the same thing equally well, and consequently many of the existing scales, which are used as substitutes for the Stanford scales may in-fact not be (Weitzenhoffer, 2000). Nevertheless, this does not necessary imply that these scales are not measuring the same thing or something relevant. All hypnotic suggestibility scales may be measuring some sort of suggestibility (or something relevant in some other way) and differences may lie with respect to other variables not common to all scales.

1.9. Conclusions

A central recurring theme in the literature on suggestion and suggestibility is the multidimensional nature of the concepts. Particularly as there is no generally accepted classification, most researchers are likely to agree with this conclusion. The multiple dimensions of suggestibility appear to have varying degrees of inter-relatedness and a number of investigators have attempted to elucidate the relationships between various measures and indices of suggestibility, in order to establish the meaningful categorisation of the various components. Unfortunately, results have been equivocal. Within the 'domain of hypnosis' (Hilgard, 1973), hypnotizability often correlates with 'primary suggestibility' and responses to direct suggestions; however, the evidence pertaining to this is not entirely consistent.

The relationship between hypnotizability and suggestibility is further complicated by the fact that methods assessing 'hypnotizability' generally do not assess the state of hypnosis or the capacity to develop it (Kirsch & Braffman, 2001; Weitzenhoffer, 2002). At best, they generally assess some form of suggestibility, perhaps imaginative suggestibility. Hypnotizability scales do not appear to reflect the true character of what the instrument is presumed to do, and consequently phenomenon and effects usually attributed to hypnosis and the hypnotic state may be more accurately described as 'suggested' effects.

In what follows, the term suggestion will be restricted to what Kirsch has described as 'imaginative' suggestion, and suggestibility will denote the capacity to produce an involuntary response (classical suggestion effect; Weitzenhoffer, 1953) to an 'imaginative' suggestion. Hypnotic suggestibility and non-hypnotic suggestibility will refer to 'imaginative' suggestibility, assessed in and out of hypnosis, respectively.

An important question emerging from the above, that is taken up in Chapter 3, is what effect if any a hypnotic induction procedure, and hence 'hypnosis' has on imaginative suggestibility. Before that though, it is important to explore the nature of hypnosis and the hypnotic procedures that might mediate any such effects.

Chapter 2

The State of 'Hypnosis'

Chapter overview

As Chapter 1 tried to make clear, suggestion is separable from hypnosis, despite the common practice of making no distinction between the two. This chapter focuses on hypnosis and examines the concepts of the 'hypnotic state' and 'altered states of consciousness'. The principle proposed characteristics of the hypnotic state, including absorption, relaxation and dissociation, and theories of hypnosis will be reviewed and evaluated. The chapter also considers the relationship between 'trance' and 'suggestion'.

2.1. Defining hypnosis

The word 'hypnosis' conjures up an endless array of images in people's minds. Therefore, it is hardly surprising that there is little agreement concerning the nature and definition of the term hypnosis. The problem is not that there is a lack of definitions, rather that there is a profusion of theories and accounts of hypnosis that are commonly viewed as incompatible and competing with one another for conceptual dominance. These divergent views about hypnosis revolve around the central debate within the hypnosis community as to whether hypnosis should be characterised as a unique altered state of consciousness or as a consequence of normal social psychological processes. This lack of a coherent definition poses problems in interpreting and analysing hypnosis and 'hypnotizability' as well as its associations with concepts such as suggestion and suggestibility, which have been inextricably linked since the late nineteenth century and by the work of Bernheim and the Nancy School (Gheorghiu, 1989a, 1989b).

2.1.1. Two principle theoretical perspectives

The contemporary question as to whether hypnosis is an altered state of consciousness is still one of the most hotly disputed issues in the area (Chaves, 1997; Kirsch, 1992; Kirsch & Lynn, 1995). Although at present there are many different theories about hypnosis in the literature, overlapping and differing in many ways, Kirsch (2004) suggests that it is possible to identify a 'generic altered state' conception of hypnosis and a 'generic non-state' view, thus allowing the grouping of these theories into two broad categories. The essence of the generic altered state conception (e.g. Bowers, 1976; Gruzelier, 1998, 2000; Hilgard, 1965, 1977; Spiegel & Spiegel, 1978; Weitzenhoffer, 2000) is that hypnotic phenomena are due to the implementation of a special state of psychological functioning characterised by unique cognitive, behavioural, phenomenological and physiological processes (e.g. altered states of consciousness, 'trance', dissociation). In contrast the generic non-state view, as taken by socio-cognitive theorists (e.g. Barber, 1969; Kirsch, 1985, 1991; Sarbin & Coe, 1972; Spanos, 1982, 1986; Wagstaff, 1981, 1986), rejects the need for an altered state explanation, believing such an approach to be inevitably misleading, as many so-called 'hypnotic' phenomena can be produced in response to suggestion by non-hypnotized individuals. Therefore, hypnotic phenomena can be explained by psychological factors, such as expectancy, motivation, voluntary goal-directed role enactments, which are present in non-hypnotic, 'waking' state (Kirsch, 1992).

Nevertheless there are a number of issues that virtually all theorists agree on (Kirsch 2000a). One of these issues is compliance and faking. It is agreed that most hypnotized subjects are not merely faking and complying with experimenter's demands. In response to suggestion in a hypnotic context, people *really* do experience alterations in sensations and perceptions; they *really* do experience, motor inhibitions, amnesia, analgesia and hallucinations. These are perceived as subjectively real, in that the individual genuinely believes what has been suggested. What is also commonly described as unusual about hypnosis is that such suggested behaviours and experiences are characteristically accompanied by a feeling of

involuntariness, a phenomenon which has been labelled the 'classic suggestion effect' (Weitzenhoffer, 1953). A notable example to illustrate the point that subjects are not merely complying with the demand characteristics of the experimenter was reported by Greene and Reyher (1972). They assigned highly hypnotizable subjects randomly to hypnosis and simulating groups, and instructed the simulators to remain out of hypnosis, whilst deceiving the experimenters into believing they were hypnotized and to react to a painful stimulus as if they were experiencing analgesia. Pain tolerance and pain intensity reports were obtained in response to increasing electric shock intensities. Despite the attempt to behave like hypnotized subjects, the simulators were significantly less tolerant to the pain stimulus, with subjects in the hypnosis group and simulator group increasing their pain tolerance by 45% and 16% respectively. The shocks were more bearable for subjects in the hypnosis group than the equally 'susceptible' role enactors. However, theoretical differences are about how these 'altered states' and unusual phenomena are brought about, rather than whether they actually exist.

Another area of agreement, as identified by Kirsch (2000a), is that many hypnotized subjects experience and report themselves as being in a special state of consciousness, and it is often this 'altered state' that is used to signify the notion of *trance.* Kirsch (2000a) points out that the main point of contention between the generic altered state view and the generic non-state conception is not whether these experiences are real, but over whether these experiences produced by suggestion (such as amnesia, hallucinations, analgesia) are entirely dependent on a unique hypnotic state or trance.

Both the generic altered state and generic non-state conceptions also agree on the point that hypnotic suggestions produce changes in physiology (Kirsch, 2000a). If most would accept that suggestion produces changes in experience, then most would accept that these changes in experience are also accompanied by changes in brain physiology and activation. This would necessarily be so, given that there are physiological markers or neural correlates for all conscious experiences (Chalmers 2000). Therefore, it is not surprising that with the

arrival of neuroimaging, studies have shown accompanying changes in brain physiology for hypnotic suggestions modulating pain perception (Derbyshire, Whalley, Stenger & Oakley, 2004; Faymonville, Laureys, Degueldre, DelFiore, Luxen, Frank, Lamy & Maquet, 2000; Rainville, Duncan, Price, Carrier & Bushnell, 1997); motor movement (Halligan, Athwal, Oakley & Frackowiak, 2000); visual perception (Kosslyn, Thompson, Costatini-Ferrando, Alpert & Spiegel, 2000); auditory perception (Szechtman, Woody, Bowers & Nahmias, 1998); attention (MacLeod & Sheehan, 2003; Raz, Shapiro, Fan & Posner, 2002); intentionality (Oakley, Ward, Halligan & Frackowiak, 2003; Ward, Oakley, Frackowiak & Halligan, 2003); and awareness of control (Blakemore, Oakley & Frith, 2003).

2.1.2. Trance and altered states vs. experiences produced by suggestion

As described earlier, most researchers agree that suggestions produce altered experiences. However, the issue that divides the generic altered state and generic non-state conceptions is whether there is a *unique* hypnotic state (i.e. 'trance'; altered state); and whether the distinctive experiences produced in hypnosis (i.e. after a hypnotic induction) by suggestion, are dependent on this hypothetical 'trance' state. This highlights two main components of hypnosis – 'trance' and 'suggestion' (Heap & Aravind, 2002).

Unfortunately, the issue regarding hypnosis, as an altered state of consciousness and its necessity, is somewhat further complicated by the lack of a common satisfactory definition of the term 'altered states of consciousness'. According to Wagstaff (1998a, 1998b) a key reason for the failure to develop a meaningful definition of hypnosis is that there are semantic disagreements about the status of hypnosis as an altered state of consciousness. For example, both Hilgard (1978) and Kihlstrom (1985) identified and distinguished between two versions of the state concept, the so-called 'strong' and 'weak' interpretations. The 'strong' interpretation of the state is the traditional understanding of hypnosis, as a special or distinct state of consciousness characterised by cognitive, behavioural, phenomenological, and physiological processes that all hypnotized individuals enter. In

contrast the 'weak' interpretation views the hypnotic state as a descriptive label representing a domain of characteristic phenomena, including suggested behaviours and self-reports of experience. The 'weak' interpretation construes the 'state' as a shorthand, with no causal properties or defining features associated with it (Hilgard, 1969; Kihlstrom, 1985).

Tart (1983) presents a clear definition of the terms 'state of consciousness' and 'altered state of consciousness', and in what follows, these terms will be restricted to Tart's definition. According to Tart, these terms have been used too loosely to describe whatever is on one's mind at the moment, and consequently Tart introduces the term *discrete state of consciousness* to accurately conceptualise a state of consciousness. Tart (1983) describes a discrete state of consciousness as 'a unique, dynamic pattern or configuration of psychological structures, an active system of psychological subsystems. Although the component structures/subsystems show some variation within a discrete state of consciousness, the overall pattern, the overall system properties remain the same. If ... you think, "I am dreaming" instead of "I am awake", you have changed a small cognitive element in your consciousness but not affected at all the basic pattern ... a discrete *altered* state of consciousness refers to a discrete state of consciousness that is different from some baseline state of consciousness... a discrete altered state of consciousness is a new system with unique properties of its own, a restructuring of consciousness' (p. 5).

Tart (1983) conceptualises a state of consciousness as a particular pattern of dynamically interacting psychological structures and subsystems (e.g. discrete state of consciousness), whilst an altered state of consciousness is when the particular pattern of interacting structures are restructuring forming a new pattern of psychological structures and subsystems with unique properties (e.g. discrete altered state of consciousness).

As of yet, there is no evidence of a 'discrete state' or 'discrete states' of hypnosis, involving unique patterns of psychological structures. The physiological and neurological evidence provided by neuroimaging studies (e.g. Egner et al., 2005; Kosslyn et al., 2000; Rainville et al., 1997) have supported the view that highly suggestible hypnotized participants really do

experience what has been suggested to them, however highly suggestible people show nearly as much responsiveness to suggestions objectively and subjectively without hypnosis as they do with hypnosis (Braffman & Kirsch, 1999). This is consistent with the body of research that reports that although hypnotic inductions enhance suggestibility, the effect is relatively small (e.g. Barber & Glass, 1962; Braffman & Kirsch, 1999; Hilgard & Tart, 1966; Hull, 1933; Weitzenhoffer & Sjoberg, 1961). In fact, most 'hypnotic' phenomena can be produced by suggestion without the use of a formal hypnotic induction or explicit reference to hypnosis (e.g. Barber, 1965; Barber & Calverly, 1964). This indicates that the unusual 'hypnotic' phenomena usually associated with hypnosis (e.g. amnesia, hallucinations, analgesia) are more than likely to be products of suggestion and not trance.

Therefore, to demonstrate that changes in brain states are due to a discrete state/discrete states of hypnosis (i.e. trance), studies would need to show that these physiological changes do not occur in participants when they respond to the same suggestions without hypnosis (Kirsch 2000a). To date, no such evidence exists (Oakley & Halligan, 2005), with all the neuroimaging studies 'indicating that the induction of hypnosis without specific suggestions for altered perception [has] little effect' (Rainville, Hofbauer, Paus, Bushnell, Duncan, & Price, 1999, p. 112). Although modest attempts have been made (e.g. Derbyshire et al., 2004; Gruzelier, 1998, 2004), neuroimaging and physiological data on the effects of suggestion without hypnosis is still somewhat lacking and remains an important avenue for future research.

So where does this leave the notion of *trance* and *altered states*? Wagstaff (1991) has pointed out that the term 'state' or 'trance' can be used within the domain of hypnosis, without necessarily implying *unique* properties outside normal psychological processing. For example, trance is often associated and described as absorption, focussed attention, and extreme concentration, which are all 'states' that occur in non-hypnotic contexts, a view almost synonymous with the 'weak' interpretation of the hypnotic state. The key issue here is that the terms 'state' or 'trance' may be used to indicate a particular state of mind in

relation to a particular procedure or hypnotic induction/ritual, which may be facilitated by motivation, expectation, and a reduction in critical thought. Consequently, you may not expect to find a unique discrete state of hypnosis (i.e. trance state), as the brain-state of an individual in trance would be no different than the brain-state of the same individual in a non-hypnotic context engaging in an absorbing task.

2.2. If 'hypnosis' is a state, what kind is it?

It appears imperative that hypnosis and suggestion are treated separately until the cognitive and neuropsychological mechanisms of both have been defined. A theory of suggested amnesia, analgesia or hallucinations is not that same as a theory of hypnosis itself, and as mentioned earlier (a key concept underlying this thesis), many make no distinction between hypnosis and suggestion. The result is that features of suggestion and hypnosis are confounded.

In this light, it may seem rather futile to examine the hypothesised characteristics and correlates of hypnosis and the hypnotic state. The following discussion does not intend to be an exhaustive critique of hypnosis theories as this is beyond the scope of this thesis and would be too large to review in any detail here (for a fuller account of a variety of theories see for example Fromm & Nash, 1992; Kihlstrom, 1985; Kirsch & Lynn, 1998; Lynn & Rhue, 1991, 1994; Spanos & Chaves, 1989); for this reason only the principle proposed characteristics of the hypnotic state, and where appropriate their accompanying theoretical framework, will be selectively reviewed and evaluated.

2.2.1. Hypnosis as a non-state

Viewing hypnosis as a non-state that involves normal behavioural and mental processes that derive from the special social-contextual situation, is a view held by socio-cognitive theorists. Consequently, research stemming from this tradition has focussed on the effects of the hypnotic context and its components, such as motivation, beliefs, expectancies, and

cognitive strategies, on suggestibility and responsiveness to suggestion. The origins of modern socio-cognitive approaches to hypnosis can be traced to the landmark work of White (1941) who posited that hypnotic phenomena were the consequence of purposeful, goal-directed actions, shaped by individuals' expectations of what the hypnotist wanted them to do. Nevertheless, White (1941) retained the belief that hypnosis was an altered state. A decade later Sarbin (1950) adopted White's notion of hypnosis as a goal directed action, but unlike White he explicitly rejected the view of hypnosis as an altered state. According to Sarbin, the goal-directed action engaged by individuals in hypnosis, is an attempt by participants to meet the social role expectations governed by prior beliefs and cues salient in the hypnotic situation. In this view participants were believed to have been role-playing or role-enacting to *look as if* they had been hypnotized so as to comply with the demands of the hypnotic situation.

Sarbin's original theory provided a framework for subsequent sociocognitve theorists (e.g. Barber, 1969; Coe & Sarbin, 1991; Kirsch 1985, 2000; Kirsch & Lynn, 1997; Spanos, 1982, 1986; Wagstaff, 1981, 1986) who all provide similar accounts and have extended Sarbin's original in significant ways. The main contemporary views of the socio-cognitive tradition have already been touched upon earlier, however, for convenience, the key extensions of Sarbin's role-theory will be briefly examined. In contrast to Sarbin's original theory, contemporary socio-cognitive theorists argue that hypnotic participants do not only *look as if* they are hypnotized, but actually perceive and experience the phenomena as real and authentic. In other words, individuals genuinely believe that they perceive and experience hypnotic phenomena involuntarily. Involuntariness is experienced by individuals in the hypnotic situation due to a misattribution of the source of their behaviour. According to the socio-cognitive approach determinants of hypnotic responsiveness include: (a) participant's expectancies that involuntariness is central to hypnotic phenomena; (b) the wording of suggestions and the interpretations of these communications; (c) engaging in strategies and goal-directed behaviour to facilitate hypnotic responding; (d) willingness of participants to adopt the hypnotic role; and (e) the way in which feedback from their own responding and

the hypnotist influences their definition and perception as a hypnotic participant (Barber, 1969; Spanos, 1982, 1986). These all contribute to individuals misattributing their behaviour and experiences as involuntary, although in reality they are engaging in an effortful and intentional process, which they are not aware of.

The major programme of work on responding to suggestion without a hypnotic induction, was undertaken by T.X. Barber and colleagues (e.g. Barber 1969; Barber & Calverley, 1964, 1965; Barber, Spanos & Chaves, 1974) demonstrating that procedures such as task-motivational instructions are as effective as hypnotic inductions in enhancing responses to suggestion. Task motivation procedures typically involved participants receiving instructions to produce positive motivation, to cooperate by imagining vividly, and to perform maximally on a 'test of imagination'. Barber (1969) showed that supposed hypnotic phenomena such analgesia, amnesia and visual and auditory hallucinations could be produced without a hypnotic induction, and moreover, following the presentation of task-motivating instructions, non-hypnotic participants showed increases in behavioural and subjective responses to suggestion as participants receiving a hypnotic induction. Research (e.g. Hilgard, 1965; Kirsch, 1997, 2000a; Spanos, 1982; Spanos & Coe, 1992; Spanos & McPeake, 1977) has repeatedly demonstrated that hypnotic phenomena, which were previously seen as unusual and transcendent in nature and attributed to a hypnotic state, can be elicited without any formal hypnotic induction with participants even reporting equivalent levels of involuntariness (when measured). However, there is some data indicating that task-motivational instructions may place a lot of pressure on participants, and may force some participants to fake hypnotic responses. Bowers (1967, cited in Kirsch & Council, 1992) found that the increased responsiveness to suggestion associated with task-motivational instructions, might reverse for some participants if an explicit and strong request is made for honesty.

As well as motivational variables, the socio-cognitive approach argues that situational variables influence hypnotic responsiveness through their effect on individuals'

expectancies. In the main, studies have manipulated expectancies by either: (i) influencing individual's beliefs and perceptions about hypnotic procedures and the hypnotic context itself; or (ii) influencing individual's beliefs and perceptions about themselves as being highly suggestible. The manipulation of relatively simple situational variables have been shown to influence participants expectancies. Barber and Calverley (1964) reported that participants are more responsive to suggestions when the experiment was described with positive connotations, such as a 'test of imagination', compared with negative connotations, such as being described as a 'test of gullibility'. Barber and Calverley (1964, 1965) have also reported that participants are more responsive to suggestions, for example when: (i) responses to suggestions were described as easy rather than difficult; (ii) the experiment was defined as 'hypnosis'; and (iii) inductions are described as highly effective rather than highly ineffective. Barber (1969) suggests that differences in responsiveness to suggestions are due to the suppression of responding by negative expectations, as positive expectancy instructions did not increase responsiveness to suggestion over and above that produced by a hypnotic induction alone.

Other studies have shown that modifying individuals' expectancies through the use of experiential feedback can profoundly effect their responsiveness to suggestion. Two notable studies by Wilson (1967) and Wickless and Kirsch (1989) involved participants receiving suggestions for alterations in perceptual and cognitive experience, which were subsequently subtly and surreptitiously confirmed by the experimenters' manipulation of the experimental situation. Wilson (1967) reinforced non-hypnotic suggestions with real experience, so for example, after presenting participants with the suggestion that the room was turning red, he covertly turned on a red light, which gave the room a slight red appearance. Manipulations such as these resulted in a substantial and significant increase in responses to suggestions due to the generation of expectations that participants would also experience phenomena described in subsequent test suggestions. Wilson's (1967) study was replicated and extended by Wickless and Kirsch (1989), who used a verbal expectancy manipulation as well as the experiential manipulation used by Wilson. Wickless and Kirsch

(1989) used bogus feedback from personality tests as their verbal expectancy manipulation, which informed participants that they were highly hypnotizable. This is an excellent example of how studies changed expectancies by influencing individual's beliefs and perceptions about themselves. Wickless and Kirsch (1989) reported that participants receiving bogus feedback responded to more suggestions than those in the no-treatment control group. Moreover, the use of both the verbal and experiential expectancy manipulations in conjunction was the most effective in increasing response to suggestions, with approximately three-quarters of the sample scoring in the high range of suggestibility.

Numerous studies have investigated the impact of expectancies on responsiveness to specific hypnotic suggestions and experiences (e.g. Bartis & Zamansky, 1986; Gandolfo, 1971; Lynn, Snodgrass, Rhue & Hardaway, 1987; Orne, 1959; Silva & Kirsch, 1987; Spanos, Flynn & Gwynn, 1988; Young & Cooper, 1972 – see also Council et al., 1996 for review). Particularly notable and striking examples come from studies that modified Hilgard's (1977) hidden-observer paradigm and manipulated information about the observer (e.g. Spanos, Gwynn & Stam, 1983; Spanos & Hewit, 1980; Spanos, Radtke & Bertrand, 1984; Silva & Kirsch, 1987). For example, Spanos et al., (1984) informed eight highly suggestible participants, who had previously reported their responses to suggestions as involuntary and had repeatedly failed to breach amnesia, that hidden parts of their minds remained aware of things that they could not consciously remember. Participants were then informed that one part of their mind was aware of everything that occurred in the right hemisphere, whilst another part of their mind was aware of everything in the left hemisphere. Participants were required to learn a list of concrete and abstract words; with half the participants being told that concrete words were stored in the right hemisphere and abstract words stored in the left. The other half were given the opposite information about storage location. Following an amnesia suggestion to forget words, equivalent high levels of amnesia were reported on the initial recall trial for both groups. However, subsequently each of the participants' 'hidden parts' were 'contacted' and asked to recall as many words as possible. Spanos et al., (1984) reported that participants behaved in accordance with the expectancy information that they

had received. So when participants' 'right hidden parts' were contacted, participants correctly recalled all of the words they believed to be stored in the right-hemisphere, and none of the words they believed to be stored in the left-hemisphere. Participants breached the suggested amnesia, demonstrating that amnesia was a function of which 'hidden part' was contacted and what words were supposedly 'known' to that hidden part.

Similarly, Silva and Kirsch (1987) also reported that highly suggestible participants could demonstrate high levels of breaching. In this study, participants were told that once hypnotized they were going to be taken 'deeper' into hypnosis. Half the participants were informed that 'deep hypnosis' would enhance their recall; with the other half informed that it would reduce their recall. Silva and Kirsch (1987) reported that 80% of participants in the enhanced-recall condition showed a complete breaching of amnesia, and 80% of participants in the reduced-recall condition exhibiting complete amnesia, demonstrating that participants behaved in line with the expectations conveyed to them.

Also studies altering expectancies by convincing participants that certain procedures can 'induce' hypnosis, have reported increases in participants' responsiveness to subsequent test-suggestions. Studies have used inert pills described as 'hypnotic drugs' (e.g. Glass & Barber, 1961; Baker & Kirsch, 1987); biofeedback (e.g. Council, Kirsch, Vickery & Carlson, 1983); and stroboscopic lights (e.g. Kroger & Schneider, 1959) to "induce" hypnosis and produce equivalent levels of suggestibility to that of formal hypnotic inductions.

More recently, based on expectancy research, Kirsch's (1985, 1991) response expectancy theory, which has subsequently been expanded into a broader theory of response sets (Kirsch, 2000a; Kirsch & Lynn, 1997), argues that all hypnotic behaviour is mediated by expectancy related cognitions derived from instructional cues and prior beliefs. Response expectancies are 'anticipations of automatic reactions in response to particular stimuli' (Kirsch & Lynn, 1997, p. 337). According to this theory, although individuals expect their behaviour to feel voluntary, volition is an attribution derived from individuals' depictions of behavioural causation. The hypnotic context is associated with culturally mediated beliefs of

loss of volitional control and passivity, and consequently behaviour by individuals in the hypnotic context is subject to the control of response expectancies. According to Kirsch (1985) the most important feature of these expectancies is that they tend to be 'self-confirming, in that they generate the expected subjective response, along with its physiological substrate' (Kirsch & Lynn, 1997, p. 337). With regard to hypnosis, when a specific suggestion is given such as an arm levitation suggestion, the response expectancy produces the associated subjective experience of the arm feeling lighter, which in turn reinforces the expectancy and produces the behaviour of the arm rising, which is accompanied by a sense of involuntariness. Kirsch and Lynn (1997) also consider intentions and expectancies as response sets which prepare the individual to respond in a particular way to particular stimuli. Intentions define the individual as the source of behaviour, whilst expectancies define a source external to the self as the cause of the action, and consequently, intentions elicit a voluntary response, whist expectancies elicit an automatic response. In hypnotic situations, individuals attribute responses to suggestion to an external source and consequently experience hypnotic phenomena as involuntary.

Numerous studies by Kirsch and colleagues have demonstrated a strong association between response expectancy and responses to suggestion (Braffman & Kirsch, 1999; Council, Kirsch & Haffner, 1986; Council, Kirsch, Vickery & Carlson, 1983; Kirsch, Silva, Comey & Reed, 1995; Vickery & Kirsch, 1991). For example, Council et al., (1983) found correlations ranging from 0.47 to 0.65 between response expectancy and variety of measures of hypnotic suggestibility. These studies have also identified that accuracy of predictions increases with, for example better knowledge of the hypnotic procedures as well as higher hypnotic suggestibility. Kirsch (2000a; Braffman & Kirsch, 1999; Kirsch and Braffman, 2001; Kirsch & Council, 1992) claims, that apart from non-hypnotic suggestibility (i.e. responses to suggestions prior to a hypnotic induction), response expectancy is the most powerful single predictor of hypnotic suggestibility.

It is evident that there is considerable empirical support for the position concerning hypnosis as a non-state that involves normal behavioural and mental processes that derive from the special social-contextual situation. Studies, carried out by researchers of the sociocognitive tradition, have focussed on the extent individuals respond to suggestions and the nature of those responses, and how they vary as a function of psychosocial factors, such as motivation, expectancy and cognitive strategies. Although the socio-cognitive gives a comprehensive account of the factors that moderate responses to hypnotic suggestions, it remains unclear how factors such as expectancy and motivation, mediate such responses. In other words, the socio-cognitive tradition fails to account for *how* responses to hypnotic suggestions are brought about; as Gruzelier (2000) puts it 'the process is missing' (p. 53). Similarly, central to the socio-cognitive tradition is the notion that individuals are prone to misattribution and implicit contextual demands, whilst remaining unaware of this activity, but again 'the process is missing' and no explanation of how these processes actually operate is offered.

Although, the position held by socio-cognitive theorists is in its own way a framework of hypnosis as a state, it could be argued that the socio-cognitive literature says very little about the hypnotic state per se and more about the effects and nature of suggestion. This in itself is not a criticism of the socio-cognitive tradition. Studies indicate that most 'hypnotic' phenomena can be produced by suggestion without the use of a formal hypnotic induction or explicit reference to hypnosis; nevertheless this does not automatically imply the hypnotic state to be non-existent. Woody and Sadler (1998a) point out that although the socio-cognitive tradition often implies that 'hypnosis is *nothing but* positive attitudes, motivations and expectations, or that hypnosis is *nothing but* the suggestion of a special condition called "hypnosis" ... to show ... that hypnosis is affected by expectancies falls far short of showing that hypnosis is nothing but expectancies' (p. 180). Weitzenhoffer (2000) argues that though the hypnotic state may not account for anything, as hypnosis is measured now, this is not an argument that can be used against its existence or its unimportance (see also, Woody and Sadler, 1998a)

2.2.2. Hypnosis as a state of relaxation

Relaxation is commonly assumed to be an essential component of hypnosis. Edmonston (1981, 1986, 1991) has presented a strongly argued case for interpreting hypnosis purely in terms of relaxation. Edmonston (1991) cites numerous studies that demonstrate that hypnotic responding of participants during hypnosis do not differ from those elicited during a condition of relaxation (e.g. Cogger & Edmonston, 1971; Plapp & Edmonston, 1965; for a review see Edmonston, 1981 or Humphreys, 1984). Edmonston's focuses upon what he terms 'neutral hypnosis', which is what happens to participants as a result of the induction procedure before suggestions are presented. Edmonston describes this state of neutral hypnosis as 'anesis'.

The notion of hypnosis as a state of relaxation is extremely problematic. The primary argument against such a conceptualisation is that if an individual can be 'hypnotized' and produce hypnotic phenomena without being relaxed, can the hypnotic state merely be a state of relaxation? Although most traditional hypnotic inductions consist of suggestions for physical and mental relaxation, there is no evidence that relaxation is an essential component of the hypnotic state or necessary for the production of other hypnotically suggested phenomenon. Studies that have used hypnotic inductions based on increasing mental alertness and physical activity provide evidence to the contrary (e.g. Banyai & Hilgard, 1976; Cardena, Alarcon, Capafons, & Bayot, 1998; Fellows & Richardson, 1993) demonstrating levels of responsiveness to suggestion as great as those produced by traditional hypnotic relaxation inductions. Nevertheless, the role of relaxation in traditional hypnotic induction procedures may be to do with enhancing the face validity of 'hypnotic' inductions rather than being an essential component of the hypnotic state, as relaxation is often consistent with lay peoples' beliefs of what hypnosis and hypnotic inductions are. Fellows (1986) concludes that any theory that posits hypnosis as state of relaxation deals with only a small part of the domain of hypnosis and perhaps not a particularly important part at that.

2.2.3. Hypnosis as a state of absorption

Absorption is probably the most popular concept that is cited in reference to the hypnotic state. The notion of the hypnotic state being a state of absorption, and likened to phenomena of being absorbed in a book, television programme, music or whilst driving is an extremely popular one, especially in the therapeutic applications of hypnosis. Indeed, in a review of hypnosis, Spanos and Barber (1974) described the concept of absorption as being the most significant point of convergence between many different theories of hypnotic responding. The construct of absorption has been defined as 'a characteristic of the individual that involves an openness to experience emotional and cognitive alterations across a range of situations' (Roche & McConkey, 1990, p. 92).

Absorption has most commonly been researched as a personality trait as measured by the Tellegen Absorption Scale (TAS: Tellegen & Atkinson, 1974; Tellegen, 1982), which measures the frequency of episodes indicative of absorption. Since the original study by Tellegen and Atkinson (1974) found a significant correlation between absorption and hypnotic suggestibility (sample 1: $r = 0.27$; sample 2: $r = 0.43$), a plethora of subsequent studies have reported a similar pattern of results (see de Groh, 1989; Kirsch & Council, 1992 for reviews). Although correlations between absorption (as measured by the TAS) and hypnotic suggestibility are generally significant, the actual correlations are low to modest. According to Kirsch and Council (1992), the correlations between the TAS and hypnotic suggestibility scales, account for approximately 10% or less of the variance in hypnotic suggestibility scores. By and large studies that have tended to use smaller samples and use a greater number of female participants[5] have reported higher correlations (de Groh, 1989; Kirsch & Council, 1992). There is also evidence that indicates that absorption is related to the more so-called 'difficult' cognitive suggestions, such as hallucinations, amnesia and age

[5] Numerous studies have found females to score significantly higher than males on absorption (e.g. Crawford, 1982; Spanos & McPeake, 1975). Although magnitude differences have usually been small, this may help explain the slightly higher correlations between absorption and hypnotic suggestibility in some studies.

regression, whilst being unrelated to the so-called 'easier' ideomotor suggestions (e.g. Balthazard & Woody, 1992; Roche & McConkey, 1990). Studies using hypnotic suggestibility scales that consist of more of the 'difficult' cognitive suggestions (e.g. SHSS:C; Weitzenhoffer & Hilgard, 1962) also appear to report higher correlations.

However, the picture is further complicated by findings that suggest that the relationship between absorption and hypnotic suggestibility is context dependent. Council, Kirsch and Haffner (1986) conducted the first study that examined whether there was still a relationship between hypnotic suggestibility and absorption, independent of any effects produced by context. In their study, participants were administered an absorption measure – the TAS; and a hypnotic suggestibility measure – a group modification of the SHSS:C in one of two different ways. Participants in the same-context group received the TAS, followed by the suggestibility scale. Participants in the different-context group were administered the TAS and the suggestibility scale in completely different settings, ensuring participants were unaware that the two constructs were being measured as part of the same study. Council et al., (1986) found that the TAS and hypnotic suggestibility correlation was only statistically significant when absorption was measured before hypnosis, with the significance disappearing when absorption and hypnotic suggestibility were both measured in separate contexts.

As far as the author is aware, eight other studies have also directly investigated the effects of context on the absorption and hypnotic suggestibility relationship (de Groot, Gwynn & Spanos, 1988; Drake, Cawood & Nash, 1990-1991; Milling, Kirsch & Burgess, 2000; Nadon, Hoyt, Register & Kihlstrom, 1991; Perlini, Lee & Spanos, 1992; Spanos, Arango & de Groot, 1993; Oakman, Woody & Bowers, 1996; Zachariae, Jorgenson & Christensen, 2000). However, evidence for the context effect as identified by Council et al., (1986) is mixed. Although the majority of studies have replicated the context effect, reporting non-significant correlations between the TAS and hypnotic suggestibility, three studies (Nadon et al., 1991; Perlini et al., 1992; Zachariae et al., 2000) have reported a significant small to

moderate relationship between hypnotic suggestibility and absorption even when context is controlled. The picture gets even more complicated, with some studies (e.g. Drake at al., 1990-1991; Nadon et al., 1991) reporting non-significant differences between the *size* of correlations between same-context and different-context conditions, indicated that context does not effect the relationship. Milling et al., (2000) identify methodological problems which may account for the anomalous results regarding the context effect. Milling et al., (2000) point out that participants were not randomly assigned to conditions in most of the studies (e.g. Council et al., 1986; Drake et al., 1990-1991; Nadon et al., 1991), with participants from the Oakman et al., (1996) study even being drawn from different populations altogether. Another factor that was not considered was the time between measurements. The interval between the absorption and hypnotic suggestibility assessments was greater in the different-context conditions compared to the same-context conditions for many studies (e.g. Council et al., 1986; de Groot et al., 1988; Nadon et al., 1991; Perlini et al., 1992); whilst for other studies, the interval between measurements is unclear (e.g. Spanos et al., 1993; Oakman et al., 1996), thus confounding the different-context conditions with a temporal factor. Milling et al., (2000) addressed these confounds, and found that even when time between assessment sessions were constant and participants were randomly assigned to conditions, a significant context effect was still obtained. Taken together studies in this area indicate at best a low to moderate relationship between absorption and hypnotic suggestibility, and of the studies that have reported a significant relationship with context controlled, the variance shared with hypnotic suggestibility is very low, approximately 4% (Milling et al., 2000).

The constructs of 'imaginative involvement' and 'fantasy proneness' are conceptually very similar to absorption, and consequently will be briefly reviewed here. The concept of imaginative involvement was constructed by J. Hilgard (1974, 1979), following a series of extended interviews, when she noted that most high hypnotizable participants tended to describe the hypnotic situation as one in which they experienced 'almost total immersion in the activity...' accompanied with '...indifference to distracting stimuli in the environment'

(1974, p. 5). Moreover, Hilgard's research reports that most of the highly hypnotizable individuals studied were more inclined to engage and be involved in, activities that required similar 'imaginative involvement', such as sports that require absolute total concentration and acting. Subsequent studies have provided support for Hilgard's observations that activities and roles that may entail greater 'imaginative involvement' correlate significantly with hypnotic suggestibility (reviewed in Council, Kirsch & Grant, 1996). As mentioned earlier, the concept of imaginative involvement is very closely related, if not practically synonymous (Kirsch & Lynn, 1995), with Tellegen and Atkinson's (1974) concept of absorption. Indeed, according to Kirsch and Council (1992), research using the TAS has been used to support the construct validity of imaginative involvement and its relationship with hypnosis. However, similar to the studies investigating absorption, it appears when context effects are controlled, the validity of the significant relationship between imaginative involvement and hypnotic suggestibility is called into question (Drake et al., 1990-1991).

The 'fantasy-prone personality' (Wilson & Barber, 1983a) is an amalgamation of various conceptually similar concepts such as absorption and imaginative involvement. It is assessed using the Inventory of Childhood Memories and Imaginings (ICMI, Wilson & Barber, 1983b), which measures the frequency, intensity and involvement of fantasy and vivid daydreaming an individual engages in child or adulthood. On the basis of the original work by Wilson and Barber (1981, 1983b) and a series of studies by Barrett (1990, 1996) and by Lynn and Rhue (1986, 1988), a strong relationship between high levels of hypnotic suggestibility and fantasy proneness has been demonstrated. Crawford (1982) reports that fantasy-prone individuals are more inclined to be involved in disproportionate amounts of image-based daydreaming, to become intensely absorbed in imaginative activities such as reading and music, as well as show high levels of imagery vividness. These findings suggest that individuals who are highly prone to engage in fantasy-related activities involving a temporary inhibition of rational and reality-bound analytical thinking will consequently be susceptible to hypnosis (Lynn & Rhue, 1988, 1991). Moreover, unlike absorption and imaginative involvement, fantasy proneness appears to remain significantly correlated with

hypnotic suggestibility, even with context controlled (e.g. Silva, 1990; cited in Kirsch & Council, 1992). However, as Rhue and Lynn (1989) point out, not at all fantasy-prone individuals are highly hypnotizable, and the studies subsequent to that of Wilson and Barber (1981, 1983b) have only found moderate correlations, indicating that there is more to hypnosis then simple proneness to fantasy. Indeed, Barber (1999) himself notes that although fantasy prone individuals have played a dramatic role in the history of hypnosis, most individuals classified as highly hypnotizable are not fantasy prone. In addition, considering that fantasy proneness as measured by the ICMI has a sizeable conceptual overlap, the components of the ICMI that correlate with hypnotic suggestibility independent of context remain unknown (Kirsch & Council, 1992).

2.2.4. Hypnosis as a state of dissociation

Since the turn of the last century and the work of Pierre Janet (1901), William James (1890/1981), and Morton Prince (1906), hypnosis has been inextricably linked with the concept of dissociation. Janet (1901) proposed hypnosis as a pathological dissociation of normally integrated personality processes, expressed through noticeable discontinuities in normal experience of the self and the world. In contrast, James and Prince contested the pathological and discontinuous characteristics of dissociation and proposed that dissociation was in fact present in the everyday non-pathological experiences of all individuals, to varying degrees.

Hilgard's Neodissociation theory and his seminal publication, *Divided Consciousness: Multiple Controls in Human Thought and Action* (1977), have often been credited with bringing dissociation and hypnosis out of their relative obscurities in pathology and bringing them into the fields of psychology and everyday non-pathological experiences. The essence of Neodissociation theory is that hypnosis is a state in which individuals become dissociated from conscious intentions and purposes, usually via the influence of hypnotic suggestions.

According to the theory, the behaviour of an individual is a product of subordinate cognitive control systems, which consist of a number of functionally independent, yet interacting paths operating in a hierarchical order. At the top of the hierarchy is a central control structure – *the executive ego* - which is responsible for planning, monitoring and managing the subordinate cognitive subsystems that are required for thoughts and actions. The executive ego itself is under conscious control of the individual and requires and consumes attentional resources. Once the executive selects the appropriate subordinate cognitive subsystems for a given task, they are active with a considerable degree of autonomy from it, and function largely outside conscious awareness. Hilgard (1992) points out that in this way, well-learned behaviours can be performed effortlessly and simultaneously, with conscious representation of complex behaviours being unnecessary. He uses the example of a bilingual person deciding to talk in one of his or her languages, after which the appropriate language is used automatically and the other language is inhibited.

Although the cognitive control systems are subject to executive ego control and monitoring, the executive ego is constrained by dispositional and situational influences. Consequently, under particular circumstances, the activity of cognitive control systems can be 'dissociated' from that of the executive ego's control. According to Hilgard, hypnosis is one particular circumstance, in which the hypnotic induction may influence the executive functions themselves, by inhibiting them and fractionalising them and subsequently changing the hierarchical arrangement. The fractionalising of the executive ego, results in part of it continuing to control and monitor in conscious awareness, with a second dissociated part exerting its influence outside awareness concealed by an amnesic barrier. The theory posits that hypnotic suggestions influence the dissociated part of the executive ego resulting in change in the hierarchical arrangement of the subsystems. The suggested actions, experiences and behaviours are experienced as involuntary, because the individual is unaware that part of the ongoing central executive ego structure has been dissociated from consciousness.

The notion of fractionation of the central executive ego was inspired by the very well known unanticipated discovery of the 'hidden observer' by Hilgard during an undergraduate demonstration of hypnosis. During the session, an individual was given the suggestion that he was completely deaf, which was subsequently successfully implemented and evidenced by no responses to shots from a starter's pistol, questions or taunts. One of the students raised the issue of whether there was some part of the individual that was aware of things happening around him, even though his overt behavioural responses indicated otherwise. Hilgard tested this by asking the participant whether or not there was a part of their mind that could hear and was processing information, and if so, to raise an index finger to sign that this was the case. Subsequently, the person's finger rose as requested, indicating that although the individual was not aware of sensory auditory information, he was nevertheless registering and processing the sensory experience in some way. Hilgard (1973) termed this the 'hidden observer' phenomenon.

Since this discovery, the hidden observer phenomenon has been investigated by studies that aimed to elucidate its prevalence and parameters. The evidence suggests that the phenomenon of the hidden observer can only be found in a small proportion of the very highly responsive hypnotic subjects. In one of the earliest studies by Hilgard, Morgan & Macdonald (1975), it was demonstrated that as a group (20 high hypnotic suggestible participants) there were significantly greater reports of 'hidden' cold-pressor pain than pain reported in the usual way whilst hypnotized following an analgesia suggestion. However, as Hilgard et al., (1975) point out, the mean findings were heavily dependent on the responses of 8 of the participants. Numerous studies have found a similar pattern of results, indicating that only a relatively small fraction of highly suggestible participants, approximately 30-40% produce the phenomenon of the hidden observer (e.g. Crawford, Macdonald & Hilgard, 1979; Hilgard, Hilgard, Macdonald, Morgan & Johnson, 1978; Knox, Morgan & Hilgard, 1974; Laurence & Perry, 1981)

A series of studies by Spanos and colleagues challenged Hilgard's neodissociation theory suggesting that the hidden observer phenomenon was a result of demand characteristics and expectations inherent in the instructions used in hidden observer experiments (Spanos, Flynn & Gwynn, 1988; Spanos, Gwynn & Stam, 1983; Spanos & Hewitt, 1980). These studies indicated that the hidden observer phenomenon was shaped by the instructions given to participants. For example, Spanos et al., (1983) found that high hypnotic suggestibles rated 'hidden' cold-pressor pain and pain reported in the usual way whilst hypnotized, as being equal intensity, unless they were given instructions explicitly identifying that one type of pain was required to be more intense than the other. Such explicit instructions were used in the early hidden observer experiments conducted by Hilgard and colleagues, which more often than not identified the expected outcome.

Acknowledging that hidden observer phenomenon may be influenced by experimental demands, Nogrady, McConkey, Laurence & Perry (1983) conducted a highly influential and unique study, which was designed to control the demand characteristics that might produce the hidden observer phenomenon. Using the real-simulator design (Orne, 1959), they found that 5 of the 12 highly suggestible participants displayed hidden observers, whilst none of the 10 high-medium suggestible participants and none of the 10 low suggestible participants simulating hypnosis produced a hidden observer response. The findings of the Nogrady et al., (1983) study, are supportive of the earlier studies by Hilgard and the neodissociation theory. However, the issue surrounding why the majority of highly suggestible participants do not display hidden observers remains, suggesting that all hypnotic phenomena can not be explained by fractionation of the executive ego and dissociation. In fact, according to Nogrady et al., (1983) only 4.28% of an unselected population can produce the hidden observer.

Neodissociation theory has been used to explain the apparent relationship between dissociation and hypnotic suggestibility in patients suffering from so-called pathological dissociation such as borderline personality and dissociative identity disorders (Brassfield,

1983; Bliss, 1986); post-traumatic stress disorder (Spiegel, 1986; Spiegel, Hunt & Dondershine, 1988); and bulimia nervosa (Kranhold, Baumann & Fichter, 1992; Covino, Jimerson, Wolfe, Franko & Frankel, 1994). It is suggested that individuals with such disorders have a tendency to dissociate to cope with the extreme stress or trauma, and consequently acquire the skills necessary for high hypnotic ability by habitually dissociating from their traumatic experiences. The relationship between hypnotic suggestibility and pathological dissociation is far from definitive, and is based on low significant correlations, and it is evident the much more research is needed in this area before it can be claimed that there is a significant relationship between the two.

Dissociation has also been investigated as a personality trait as measured by the well researched scale: the Dissociative Experiences Scale (DES, version 1: Bernstein & Putnam, 1986; DES version 2, Carlson & Putnam, 1993). The DES was originally designed to measure pathological dissociation and was intended for use in clinical populations as a tool to discriminate between patients diagnosed with and without dissociative disorders. Carlson and Putnam (1989) using factor analysis found three main factors that accounted for most of the variance in DES items (dissociative amnesia; depersonalisation/de-realisation; absorption).

Most research examining the relationship between dissociation scales and measures of hypnotic suggestibility have reported significant but low correlations of between 0.12 to 0.27 (e.g. Butler & Bryant, 1997; Frischolz, Braun, Sachs, Schwartz, Lewis, Schaeffer, Westergaard & Pasquotto, 1992; Nadon, Kihlstrom, Hoyt & Register, 1991; Oakman, Woody & Bowers, 1996). With the exception of the study by Butler and Bryant (1997), the correlation between hypnotic suggestibility and the DES is only significant when the two are measured in the same context (Kirsch & Council, 1992). Frischolz et al., (1992) found that recall on the hypnotic amnesia item on the HGSHS:A, was negatively correlated with the total DES score as well as the dissociative amnesia, depersonalisation/de-realisation and absorption factors identified by Carlson and Putnam (1989), indicating a relationship between amnesia and

these aspects of dissociation. However, few studies have examined the relationship between specific items on hypnotic suggestibility scales and the DES, which may elucidate any relationships. The relationship is further complicated by the fact that the DES is significantly correlated with the Tellegen Absorption Scale (TAS: Tellegen & Atkinson, 1974), which is not surprising given that Carlson and Putnam identified absorption as one of the three main factors accounting for variance in the DES.

Bowers and colleagues (e.g. Bowers, 1992, 1994; Woody & Bowers, 1994) although continuing to hold on to dissociation as an explanation of hypnosis, formulated a revision of Hilgard's neodissociation theory, based on Norman and Shallice's (1986) neuropsychological model of voluntary and involuntary regulation of behaviour. The theory rejects the idea of an 'amnesic barrier', and relocates the influence of hypnosis and hypnotic suggestion with respect to Hilgard's model. Bowers (1992) argues that if hypnosis involved an amnesic barrier, then all hypnotic phenomena would involve an element of spontaneous amnesia. You would also expect a high proportion of individuals to experience amnesia when it is suggested to them, which is not the case, with the amnesia item on hypnotic suggestibility scales often cited as one of the more difficult if not the most difficult item to pass.

According to Hilgard's neodissociation theory, hypnosis acts upon the central executive ego, causing executive fractionation and *indirectly* controls the appropriate subordinate cognitive control systems through the part of the executive ego that is concealed from conscious awareness by the amnesic barrier. In contrast Woody & Bowers' (1994) Dissociated Control theory, posits that hypnosis *directly* controls the appropriate subordinate cognitive control systems, bypassing and inhibiting the executive control over the subordinate subsystems.

The key difference between the two theories is that neodissociation theory describes the hypnotic response as an intentional act that is *perceived* as involuntary; whilst dissociated control theory suggests that the hypnotic response is *truly* involuntary and hypnosis affects the way behaviour is controlled, rather than only how it is experienced, with the hypnotic

response and cognitive activity occurring simultaneously, rather than the latter mediating the former. A small number of studies have provided support for the dissociated control view, showing hypnotic phenomena such as hypnotic analgesia (e.g. Miller & Bowers, 1993) and hypnotic amnesia (e.g. Bowers & Woody, 1996) as being relatively automatic processes compared to so-called non-hypnotic phenomena such as stress inoculation procedures and suggestions in a non-hypnotic context. Woody and Bowers (1994) have often compared the hypnotized individual to a frontal lobe patient, and a study by Woody and Farvolden (1998) examined this possible relationship by comparing high and low hypnotic suggestibles in both a hypnotic and non-hypnotic context, on memory tasks that were sensitive to the functioning of the frontal lobe. Woody and Bowers hypothesis would be that high suggestibles in a hypnotic context would do significantly worse on the memory tasks compared to high suggestibles in a non-hypnotic context, or low suggestibles in either contexts. The results indicated that high suggestibles preformed poorly on memory tasks irrespective of context (as well as when compared to low suggestibles), which is inconsistent with the model, and may suggest that 'hypnotic' suggestibility differences are more important than whether hypnosis is induced or not.

The evidence supporting dissociation theories (neodissociation and dissociated control) is at best inconclusive and at worst plagued with contradictions and conceptual difficulties (Dixon & Laurence, 1992; for a fuller critique of dissociation theories of hypnosis see Kirsch & Lynn, 1998; for replies see Kihlstrom, 1998; Woody & Sadler, 1998b). Regarding neodissociation theory, the only direct evidence for the hypothesised amnesic barrier is that of the hidden observer, with the majority of studies indicating a very low proportion of highly suggestible individuals exhibiting the phenomenon. If, as neodissociation theory posits, dissociation is the basis of all hypnotic phenomena, then the hidden observer, which represents a split in executive functions and dissociation, should be present in the majority if not all high hypnotically suggestible individuals. However, the literature suggests that this is not the case, and as Woody and Bowers (1994) point out, a process requiring a very rare phenomenon such as spontaneous selective amnesia, can not be responsible for all hypnotic

behaviours including very common responses, such as responses to simple ideomotor suggestions. It would also appear that hidden observer reports are extremely sensitive to demand characteristics and contextual cues, which indicates that it is more likely to be a suggested effect than a reflection of a dissociated non-hypnotized hidden part of consciousness (Kirsch & Lynn, 1998). The evidential base regarding neodissociation theory and studies assessing the relationship between dissociative ability and hypnotic suggestibility is small and unpredictable. The correlations between suggestibility measures and the DES are low but significant when both are measured in the same context, and almost non-existent and non-significant when both are measured in separate contexts. Neodissociation theory also does not provide a satisfactory, and detailed systematic account of how and why the forms of dissociation are brought about in connection with hypnotic phenomena. There are a profusion of issues that need explaining including, how an amnesic barrier is produced and what it consists of; how the variety of hypnotic phenomena come into being; and how do hypnotist's words influence individuals in this way (see Kirsch & Lynn, 1998).

Dissociated control theory is a relatively 'young' theory, which may explain partly why there is only a small empirical body of work in support of it, and why many of the specifics of the theory have not been elucidated. The strengths of dissociated control theory lie with (i) its consistency with contemporary neuropsychological work, and dual-system theories of automaticity and volition (e.g. Norman & Shallice, 1986; Goldberg, 1987); and (ii) its rejection of the notion of an amnesic barrier, consequently distancing itself from the problematic hidden observer phenomenon. A key shortcoming of dissociated control theory is that it proposes that hypnotic phenomena are produced by an altered state of consciousness. As discussed in detail earlier, there is still no evidence of a unique altered state of consciousness. This is somewhat problematic for the theory, as the effects of non-hypnotic suggestions and post-hypnotic suggestions cannot be accounted for, as individuals are not presumed 'hypnotized' or in 'an altered state of consciousness' when they respond to these types of suggestions (Kirsch & Lynn, 1998). Equally problematic for dissociated theory is how to account for self-hypnosis, as the theory is based on the traditional hetero-

induction. According to the theory executive control is inhibited during hypnosis, however, it would appear that self-hypnosis would require some form of executive control.

The theory also proposes that although social factors may account for responses to so-called 'easier' ideomotor and challenge suggestions, dissociation is required for production of more 'difficult' suggestions such as analgesia, amnesia and hallucination (e.g. Balthazard & Woody, 1992; Hargadon, Bowers & Woody, 1995; Woody & Sadler, 1998b). However, a large number of studies have provided contrasting evidence, demonstrating that the generation of the more 'difficult' suggestions are also sensitive to expectations and contextual demands (e.g. Kirsch et al., 1995; Spanos, 1986; Spanos & Coe, 1992). Given this position, it is surprising that Woody and Bowers (1994) provide a detailed explanation of how ideomotor and challenge suggestions are generated, whilst not satisfactorily or systematically accounting for the so-called more 'difficult' suggestions.

A dissociation theory of hypnosis, whether it is conceptualised as a fractionalisation of consciousness or weakened executive control, is intuitively compatible with hypnotic phenomena, as it is easy to conceive of individuals exhibiting various degrees of dissociation whilst generating hypnotic phenomena such as amnesia, analgesia and hallucinations. Kirsch and Lynn (1998) argue that despite the conceptual problems and problematic empirical bases of both theories, the concept of dissociation should not be rejected, and the term dissociation should be used as a descriptive label, analogous to the 'weak' interpretation of the altered state – 'the domain of dissociation intersects with, but is not identical to hypnotic phenomena' (Kirsch & Lynn, 1998, p. 112)

2.2.5. Hypnosis as an altered state of brain functional organisation

Research investigating the psychophysiological mechanisms of hypnosis can be traced as far back as Charcot and colleagues, although was not tested empirically till the late 1960s and early 1970s, with studies examining differences in hemisphericity and EEG activity. Since then research has become more sophisticated, complex and specialised, with probably the

most influential developments in understanding in this area resulting from the expanding and evolving neuropsychophysiological model of hypnosis (Crawford, 1994; Gruzelier, 1996, 1998; Crawford & Gruzelier, 1992). According to the neuropsychophysiological model, hypnosis is a state of altered brain function organisation, which involves shifts in physiological and cognitive activity and the relocation of attention. More specifically, as a highly suggestible individual enters and becomes deeply absorbed in the hypnotic procedure and context, the individual experiences a shift in consciousness characterised by a shift away from analytical, sequential types of processing, to a more holistic and imaginal mode, resulting in a decrease in reality testing and an increase in dissociative experiences.

The neuropsychophysiological model is essentially a working model that has been developed and built up from a vast programme of neurophysiological findings, and consequently there is a substantial body of research in support of it. Support for the notion that hypnosis involves a shift from left-hemisphere analytical and sequential types of processing, to more holistic right hemisphere oriented processes has been provided in studies by Gruzelier and colleagues (e.g. Gruzelier & Brow, 1985; Gruzelier, Hancock & Maggs, 1991; McCormack & Gruzelier, 1993). For example, Gruzelier and Brow (1985) demonstrated that in high suggestible participants habituation of electrodermal responses was faster to tones during hypnosis than in the non-hypnotic baseline. The electrodermal responses in highs were significantly lower on the left hand (i.e. right hemisphere) during hypnosis than in baseline, indicating a shift in lateralisation from left hemispheric influences in non-hypnotic baseline to right hemispheric influences in hypnosis. Low suggestibles did not show this difference. A subsequent investigation by Gruzelier, Allison and Conway (1988) (cited in Crawford & Gruzelier, 1992) replicated these findings, and demonstrated that facilitation of habituation does not occur in participants instructed to simulate being hypnotized. Support for the idea that left-hemispheric processes are inhibited whilst a shift towards more holistic right hemisphere orientated processes occur during hypnosis, has been shown in several studies (Cikurel & Gruzelier, 1990; Gruzlier, Brow, Perry, Rhonder & Thomas, 1984). Using haptic tactile discrimination tasks, high suggestible participants in

these studies showed a significant slowing in right hand (i.e. left hemisphere) sorting times following the induction of hypnosis, with the degree of slowing correlating significantly with hypnotic suggestibility level. A series of studies by Crawford have also provided support for the hypothesised shift to holistic processes during hypnosis, reporting that high suggestible participants show substantial improvement on a variety of tasks, such as visual memory tasks and spatial memory for location, suggesting greater right-hemispheric involvement during hypnosis amongst high suggestible individuals (e.g. Crawford, 1989; Crawford & Allen, 1983; Crawford, Wallace, Nomura & Slater, 1986).

The essence of Gruzelier's model (Crawford & Gruzelier, 1992; Gruzelier, 1998) and the findings of the vast programme of work is that hypnosis is a three-stage temporal process. Firstly, during the induction of hypnosis there is focussed attention on the words of the hypnotist with disattention to extraneous stimuli, as shown by greater frontal left-hemispheric activation in high suggestible compared to low suggestible participants prior to and during the beginning of the hypnotic induction (e.g. Gruzelier & Brow, 1985). Secondly, once attention and the supervisory attentional system has been sufficiently engaged, and the highly suggestible individual enters and is deeply absorbed in the hypnotic experience, suggestions for relaxation and/or 'letting go' and 'going with the flow' bring about alterations in cognitive strategies, which bring about an inhibition of the left-hemisphere and shift to right hemisphere oriented processes (e.g. Gruzelier et al., 1984). This corresponds to a shift away from analytical modes of processing to more holistic processing (e.g. Crawford & Allen, 1983). Finally, any further use of suggestions involve primarily the right hemisphere and the posterior cortical sites (e.g. Crawford, 1989).

The notion that hypnosis involves extremely focussed and sustained attention is also closely related to the concept of absorption, and numerous studies have shown significant relationships between the two (e.g. Crawford, Brown & Moon, 1993). A number of studies have reported relationships between attentional processing and hypnotic suggestibility. High suggestibles have been shown to have superior performance on variants of the

embedded figures task, using words (e.g. Wallace & Patterson, 1984) and pictures (Priebe & Wallace, 1986; Wallace, 1988). Differences in the embedded figure task have been explained in terms of high suggestibles abilities to flexibly shift attention, using holistic and analytical strategies to find embedded figures or words (Zelniker, 1989). A study by Van Nuys (1973) provides further support of this proposition, reporting significant negative correlations between hypnotic suggestibility and (i) the number of intrusive thoughts on a concentrative meditational task (r = -0.32); and (ii) participant's own breathing during the task (r = -0.42). High suggestibles have also been shown to be more responsive and report significantly more reversals of reversible figures and illusions such as the Necker Cube and the Schroeder staircase (e.g. Wallace, 1988; Wallace, Knight and Garrat, 1976) as well as a variety of other perceptual illusions, including autokinetic movement (e.g. Atkinson & Crawford, 1992; Crawford et al., 1993; Wallace, Garrett & Anstadt, 1974).

However, a recent critical evaluation of the relationship between sustained attentional abilities and hypnotic suggestibility by Jamieson and Sheehan (2002), questions the notion that a high level of hypnotic suggestibility is significantly positively related to sustained attentional ability. They argue that a lack of replication of many of the studies cited in support of this relationship, and uncertainty regarding the nature of measures, makes a definitive interpretation difficult. Jamieson and Sheehan (2002) conducted a factor analytical study to explore the nature of the relationship between hypnotic suggestibility (as measured by the HGSHS:A; Shor & Orne, 1962) and a range of behavioural measures cited in the literature to index sustained and focussed attentional abilities, including – the binaural word pairs test, signal detection intrusions, reversible figures, and a modified version of the TAS. Using a considerably larger sample (n = 182) than previous studies, they reported no evidence of a relationship between performance on a wide range of standardised tasks and hypnotic suggestibility for any of the experimental tasks included. They conclude that 'the time is ripe for a conceptual and empirical re-evaluation of the role of attentional processes in hypnosis ... the future investigation of attention and hypnosis will need to take much greater cognizance of theories and methodologies within these

disciplines if progress is to be made toward an integrated scientific understanding of this topic' (p. 72).

Nevertheless, the lack of relationship between sustained attentional abilities and hypnotic suggestibility is not surprising, even within the neurophysiological framework. According to the neurophysiological model (Gruzelier, 1998, 2000), hypnosis is a temporal process, and consequently although sustained and focussed attention is a necessary pre-requisite of initiating hypnosis, i.e. stage 1, it does not imply that hypnosis is itself a more efficient and enhanced stated of focussed attention. Subsequent to this initial focussing of attention, it is proposed that instructions of the conventional hypnotic induction inhibit left frontal functions (Gruzellier & Warren, 1993; Kallio, Revonsuo, Hämäläinen, Markela & Gruzelier, 2001), which is consistent with the speculated reduced influence of the supervisory attentional system by Woody and Bowers (1994), as evidenced by deteriorated accuracy on the Stroop paradigm (e.g. Jamieson & Sheehan, 2004; Kaiser, Barker, Haenschel, Baldeweg & Gruzelier, 1997; Nordby, Hugdahl, Jasiukaitis & Spiegel, 1999). Jamieson and Sheehan (2004) argue that hypnosis is more consistent with diminished rather than enhanced executive functioning, and that the 'deeply absorbed experiences that characterize high [suggestibles], both in hypnosis and in daily life, are not the products of more efficient frontal networks of attention control. Rather, they result from a perseveration in the object or theme of current awareness, due to the temporary and partial inhibition of these very processes of self-directed attentional control' (p. 245).

Perhaps the greatest shortcoming of the neurophysiological model of hypnosis is its reliance on an altered state of consciousness, which it shares with other altered state theories, such as dissociated control theory (Bowers, 1992). Gruzelier (2000) proposes that the 'instructions of the conventional hypnotic induction are there for a neurophysiological purpose, and are not simply a cultural artefact to bolster demonstrable power of contextual suggestion' (p. 54). However, as has been discussed earlier, phenomena can be suggested successfully without prior induction of hypnosis (e.g. Barber, 1969; Barber & Calverley, 1965). Related

to this, is the lack of appropriate control conditions in many studies, and it remains unclear whether the physiological changes are unique to hypnosis or simply a mirror of the induction process being used. For example, would the same physiological changes occur if hypnosis were induced using a post-hypnotic suggestion or signal? In addition, similarly to dissociated control theory, the neuropsychophysiological model experiences problems when attempting to explain self-hypnosis, with the notion of inhibited executive control being incompatible with the idea that some level of executive control would be needed for self-hypnosis (Gruzelier, 1998).

According to the neuropsychophysiological model, a hypnotized individual experiences a shift in consciousness characterised by a shift away from analytical, sequential types of processing, to a more holistic and imaginal mode, resulting in a decrease in reality testing and an increase in dissociative experiences. Conceptualisations such as 'holistic and imaginal mode' and 'decrease in reality testing' need to be systematically and defined in more detail. Moreover, although there is a considerable body of well-designed research detailing the various cognitive and physiological processes that occur during hypnosis, the details of how hypnotic inductions bring about hypnotic phenomena is still lacking.

2.3 Conclusions

The search for a unique state of hypnosis has yielded meagre results, with the evidence suggesting that there is no indicator of such a unique state. Many sociocognitive theorists cite this as evidence against a 'special state' of hypnosis. However, Gruzelier (2000) suggests that the quest for a unitary marker of hypnosis is naïve. Woody and McConkey (2003) similarly posit that the search for a unitary hypnotic state is misguided, and although once an important issue in the history of hypnosis, is no longer a fruitful approach to hypnosis. A number of recent researchers have called for integration between theoretical perspectives (Gruzelier, 2000; Kihlstrom, 1997; Kirsch & Lynn, 1995; Nadon, 1997; Wagstaff, 1998a), nonetheless, Woody & Sadler (1998b) write 'in a field like hypnosis, in which we are still

groping forward and many quite basic issues remain to be explored and resolved, we may not be anywhere near such a final and complete theory' (p. 192).

Although an accepted integrative framework has yet to be developed, many researchers agree that different theorists are looking at diverse aspects, including social, cognitive, phenomenological, and physiological aspects, of the same phenomenon. The notion of levels of explanation has been offered as a framework to account for the diversity in explanations, which do not necessarily have conceptual incompatibility. For example, Wagstaff (2000) distinguishes psychological explanations from physiological explanations, writing that 'the argument that [psychological] models cannot ultimately explain anything because they do not refer to physiology is mistaken ... it is more accurate to say that the processes described by such theories represent a different level of explanation' (p. 155). Woody and McConkey (2003) suggest adopting a dynamic-systems conception of a state, which characterises the hypnotized person as a set of related or interacting variables, i.e. a system. According, to Woody and McConkey (2003) 'the implications of this framework are that researchers should study the *variety of continuous states* that occur within hypnosis, characterising the dimensions of the state space in a *multivariate* way, and examining the *pattern of change* in these states across time' (p. 312). This approach as seeing hypnosis as a continuous rather than a categorical state and a temporal process is almost synonymous to what once was a unique approach taken by Gruzelier and Crawford which considers hypnosis as dynamic interrelations between brain regions, brain rhythms and neurotransmitters (Gruzelier, 1998; Crawford & Gruzelier, 1992; Crawford, 1994).

The dynamic-systems conception of the state, advocated by Tart and others (see section 2.1.2), provides a potentially useful framework, and if adopted then research needs to focus on the underpinnings of these dynamic states and how they can be characterised (Woody & McConkey, 2003). However, if researchers look at the diversity of states that occur in hypnosis and their patterns across time, instead of a unique signature, the question still remains whether experiences produced by suggestion are in any way dependent on some, if

any, of the states attained in hypnosis. As mentioned earlier, there is no evidence to suggest that hypnotic inductions possess such properties, re-emphasising the importance of distinguishing between the hypothetical 'hypnotic state' and phenomena produced by suggestion (Kirsch, 1997; 2000a). Although many functional brain imaging studies have been cited as supporting evidence of the hypnotic state by showing accompanying changes in brain physiology (e.g. Kosslyn et al., 2000; Rainville et al., 1997; Szechtman et al., 1998), these studies have only examined the effect of hypnotic suggestions on various sensory and perceptual dimensions, and have not directly addressed the status of hypnotic states.

Two studies (Rainville et al., 1999; Rainville, Hofbauer, Bushnell, Duncan & Price, 2002) have directly addressed the status of hypnotic states, without confounding the effects of 'hypnosis' with the effects of specific suggestions. Both these studies identified and characterised hypnosis as involving changes in brain activity within regions involved in the control of consciousness states, such as the brainstem, the thalamus and the anterior cingulate cortex, as well areas such as the ventrolateral frontal and right posterior parietal cortices which have been shown to regulate attentional processes through the mechanisms of executive attention. The notion that the hypnotic state involves frontal alterations has also received strong support from studies that show that high hypnotic suggestibles exhibit impaired attentional control after hypnotic induction, as evidenced by deteriorated error performance on the Stroop (Stroop, 1935) paradigm (e.g. Jamieson & Sheehan, 2004; Kaiser et al., 1997; Nordby et al., 1999) and attenuated responses (Gruzelier & Brow, 1985; Gruzelier et al., 1988). Gruzelier (2005) notes that one cannot ignore the involvement of the frontal areas, with forthcoming evidence from numerous studies (also see section 2.2.5.) using a range of measures, including event-related potentials (Gruzelier, Gray & Horn, 2002; Jutai, Gruzelier, Golds & Thomas, 1993; Kaiser et al., 1997); EEG (Egner et al., 2005; Gruzelier, 1998); haptic sorting (Cikurel & Gruzelier, 1990; Gruzelier et al., 1984); letter versus category word fluency tasks (Gruzelier & Warren, 1993; Kallio et al., 2001); and FMRI (Egner et al., 2005). Indeed, Egner et al., (2005) provided evidence of decoupling between two regions frequently implicated as correlates of the hypnotic state, namely the

anterior cingulate cortex and the lateral frontal cortex. At present it appears 'that the neural correlates of the ASC [altered state(s) of consciousness] of hypnosis might be found in the changed activity in the frontal areas' (Kallio & Revonsuo, 2005, p. 51).

Oakley and Halligan (2005) suggest that these structures are 'exactly the ones we would have expected to be involved in such a process and that the 'state' of hypnosis appears to be a perfectly normal one in the sense of being based on mundane brain processes' (p. 15). At present, although there is emerging evidence that hypnosis can be understood in terms of known attentional processes and brain systems, we still do not know about its necessity or if suggested effects that occur prior to a hypnotic induction are represented differently in the brain compared to suggested effects following a hypnotic induction. The following chapter critically examines the handful of experimental[6] studies that have directly investigated the effect of 'hypnosis' on suggestibility, in which the same suggestions were given with and without prior induction of hypnosis.

[6] In contrast to neuroimaging studies

Chapter 3

Hypnosis and Suggestibility

Chapter overview

The literature examined in the previous chapter indicated that there is no evidence for a hypnotic state involving unique patterns of psychological functions. The hypnotic state appears to be an inference rather than an observed fact and probably the only thing we can say with reasonable certainty is that procedures traditionally associated with inducing this hypothetical state have the ability in some cases to enhance responses to suggestions. This chapter critically evaluates the effect hypnosis, or more specifically a hypnotic induction procedure, has on responses to suggestion.

3.1. Hypnosis and suggestion

Hypnosis and suggestion have been inextricably linked since the nineteenth century by the investigations of Braid (1843) who viewed suggestions as acting more powerfully during hypnosis. There is no question that for Braid and a great many early investigators of hypnotic phenomena, responsiveness to suggestions were believed to be facilitated by the hypnotic 'state' and procedures labelled as hypnotic inductions. Bernheim (1902) wrote 'hypnotism ... facilitates suggestion when it can be induced' (p. 141). Sidis (1898) understood 'suggestion [to be] all-powerful in the hypnotic trance; [with] the hypnotic trance... in fact [being] a state of heightened suggestibility' (p. 70). Hull (1933) believed 'the essence of hypnosis [lay] in the fact of change in suggestibility' (p. 391).

Increase in suggestibility has been so fundamental to views about hypnosis, that it has been considered by many to be a defining characteristic of hypnosis. The notion of 'hypnosis as heightened suggestibility' will be examined with evidence on the effects of hypnosis and

hypnotic procedures on suggestibility being critically evaluated. Original evidence stems from: (i) early experiments published in Hull's (1933) text, which tested suggestions for postural sway and lateral arm movement within (i.e. after a hypnotic induction) and outside hypnosis (Hull & Huse, 1930; Williams, 1930; Caster & Baker, 1932; Jenness, 1933); and (ii) more rigorous broad-scope experiments that used a battery of standardised test-suggestions to measure responsiveness to suggestions (Weitzenhoffer & Sjoberg, 1961; Barber & Glass, 1962; Hilgard & Tart, 1966; Braffman & Kirsch, 1999). Tables 3.1 and 3.2 summarise these findings. It was argued in Chapter 1, that the term hypnotizability is a misleading label (Kirsch & Braffman, 2001) and that strictly speaking, hypnotizability should be viewed as the change in suggestibility produced by inducing hypnosis. Nevertheless, hypnotic suggestibility (i.e. responsiveness to suggestions after a hypnotic induction - as measured by so-called hypnotic susceptibility scales) is often used on its own as a measure of hypnotizability. The handful of studies reviewed in this chapter measure hypnotizability in its conceptually more appropriate form, as they all control for non-hypnotic suggestibility (i.e. responsiveness to suggestions prior to hypnosis or a hypnotic procedure).

3.2. Early experiments involving a single test of suggestibility

Hull and Huse (1930) appear to have been the first to directly investigate the effects of hypnosis on suggestibility. Their approach was to compare the suggestibility of participants in the absence of any formal hypnotic induction (non-hypnotic context) with their suggestibility following a hypnotic induction (hypnotic context). Suggestibility was measured by the length of time in seconds required to evoke maximal postural reaction in response to postural sway suggestions. Hull and Huse (1930) found that every one of their eight participants showed a clear difference in speed of response in favour of the hypnotic context, indicating that participants are more responsive to suggestions following a hypnotic induction.

Table 3.1. Suggestibility in non-hypnotic and hypnotic contexts for investigations using a single test of suggestibility

Study	Cases (N)	Suggestion Measure	Suggestibility Difference	Effect Size (*d*)
Hull & Huse (1930)	8	Postural suggestions to induce 'falls'	13.12 seconds	0.73
Williams (1930)	8	Postural suggestions to induce 'falls'	8.48 seconds	0.65
Caster & Baker (1932)	10	Suggestions to move laterally a horizontally extended arm a distance of 8-inches	23.90 seconds	0.82
Jenness (1933)	8	Suggestions to move laterally a horizontally extended arm a distance of 8-inches	16.09 seconds	0.70

Note.

Suggestibility difference is the mean time for responses to suggestion following a hypnotic induction (hypnotic suggestibility) minus the mean time for responses to suggestion prior to a hypnotic induction (non-hypnotic suggestibility). *Effect Sizes* were calculated using original standard deviations, rather than paired t-test values, as recommended by Dunlap, Cortina, Vaslow, & Burke (1996). See later in this chapter for a discussion of effect sizes and their interpretation (section 3.3.3)

In recognition of the importance of the question involved to views on the nature of hypnosis, three studies soon after (see Table 3.1), investigated the effects of hypnosis on suggestibility, using similar methodology to that of Hull and Huse (1930). The results reported by Williams (1930), Caster and Baker (1932) and Jenness (1933) follow the same general pattern of those reported by Hull and Huse (1930), with the vast majority of participants responding to suggestions faster following a hypnotic induction. Taken together, these four studies, demonstrate that hypnosis increases individuals' responsiveness to suggestion, although Hull (1933) concluded that 'the amount of... hypersuggestibility... while considerable... is probably far less than the classical hypnotists would have supposed had the question ever occurred to them' (p. 298).

However, these studies were beset with weaknesses (Hull, 1933; Weitzenhoffer & Sjoberg, 1961). A great shortcoming of these early studies is the use of only a single test of

suggestibility (e.g. postural sway suggestions), and as a consequence the potential of individuals to produce a variety of so-called hypnotic phenomena (e.g. amnesia, hallucinations) in response to suggestions were not measured. As Hull (1933) himself noted, 'responses to suggestions of postural movement is only one of many possible ways of securing quantitative evidence of hypersuggestibility.' (p. 298). Another weakness was, with the exception of the study by Jenness (1933), all the hypnotic inductions and suggestions in these studies were given verbally, leaving open the possibility of the experimenter(s) unwittingly biasing the experimental outcome. In addition, the hypnotic induction procedures used in these studies are unclear, with one study (Jenness, 1933) using a 'standardised hypnotic technique' and others using eye-closure as the sole criterion of the presence of hypnosis.[7]

3.3. Experiments involving standardised test-suggestions

Although the data from studies that used a single test of suggestibility were consistent with the assumption that responsiveness to suggestions were facilitated by hypnotic procedures labelled as hypnotic inductions, it was not until 30 years later that this assumption was tested rigorously using a broad-scope of test suggestions, by three seminal studies.

Weitzenhoffer and Sjoberg (1961) used 17 standardised test-suggestions, to quantitatively assess and compare non-hypnotic suggestibility with hypnotic suggestibility. The suggestions included eight items from the Stanford Hypnotic Susceptibility Scale, Form A (Weitzenhoffer & Hilgard, 1959), as well as other suggestions that would be categorised as 'difficult' cognitive suggestions (e.g. automatic writing, hallucinated voice, age regression, negative visual hallucination). Hilgard (1973) describes these 'difficult' cognitive suggestions as 'true hypnotic' suggestions that are indicative of 'true' hypnotic phenomena. Weitzenhoffer and Sjoberg (1961) reported a small but significant increase in suggestibility

[7] As discussed in Chapter 2 there is no evidence of a unique marker indicating an individual is 'hypnotized'. Moreover, there is no evidence to indicate that eye-closure is an essential component of hypnosis (e.g. Barber & Calverley, 1965)

following a hypnotic induction, with a mean change of 2.30 suggestions. Thirteen (30 %) participants did not experience an increase in responsiveness to suggestion following a hypnotic induction, and of the 31 (70%) participants showing increased suggestibility, only 8 (18%) showed relatively large increases in suggestibility (5 or more suggestions on a 17-suggestion scale).

Table 3.2. Suggestibility in non-hypnotic and hypnotic contexts for investigations using standardised test-suggestions

Study	Cases (N)	Suggestion Measure	Suggestibility Difference	Effect Size (*d*)
Weitzenhoffer & Sjoberg (1961)	44	17-test suggestions, including 8 items from the SHSS:A	2.30 suggestions	0.63
Barber & Glass (1962)	30	8-test suggestions, which later became the BSS (1965).	0.5 suggestions	*
Hilgard & Tart (1966) Exp. 1	40	10-test suggestions from the SHSS:C	2.01 suggestions	0.73
Braffman & Kirsch (1999) Exp. 1	92	7-test suggestions from the CURSS.	0.90 suggestions	0.55
Exp. 2	170		0.53 suggestions	0.30

Note.

Suggestibility difference is the mean behavioural score for hypnotic suggestibility minus the mean behavioural score for non-hypnotic suggestibility. The *Effect Size* of the Barber and Glass (1962) study could not be determined as standard deviations were not included in the original paper.

A year later Barber and Glass (1962) conducted an investigation along similar lines. They used 8 standardised test-suggestions, and again compared participants' non-hypnotic suggestibility with their hypnotic suggestibility. Similar to the results reported by Weitzenhoffer and Sjoberg (1961), Barber and Glass (1962), found a small but significant increase in suggestibility following a hypnotic induction, with a mean change of 0.5 suggestions. Fifteen (50%) participants did not increase in suggestibility following a hypnotic induction, and of the 15 (50%) participants showing increased suggestibility, only

8 (27%) showed relatively large increases in suggestibility (1.5-3 suggestion on a 8-suggestion scale).

A third experiment carried out by Hilgard and Tart (1965), confirmed the previous findings of Weitzenhoffer and Sjoberg (1961) and Barber and Glass (1962). In this study 10 standardised test-suggestions from the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C, Weitzenhoffer and Hilgard, 1962) were used. Participants' responses to test suggestions following a hypnotic induction, increased significantly by 2.01 suggestions.

Taken together, the results of these studies indicate that hypnotic induction increases mean levels of responsiveness to suggestion by a significant, but very modest degree and only in some individuals. Approximately, 30-50% of participants do not experience an increase in suggestibility following a hypnotic induction; with a small increase in suggestibility experienced by 25% of participants, and a relatively large increase in suggestibility experienced in the remaining 25% of participants. The data from these studies also indicate that participants' responsiveness to suggestions in the absence of a hypnotic induction is relatively high, with some responses and experiences being produced easily by the vast majority of people. For example, on average, participants in the Hilgard and Tart (1966) responded to 3 suggestions out of 10 (from the SHSS:C) prior to a hypnotic induction, and 5 suggestions after a hypnotic induction.

3.3.1. Limitations

Although laboratory data have shown an enhancement of suggestibility to exist, there are several caveats concerning this research that need to be identified. Most importantly, all the participants in the three studies received suggestions prior to a hypnotic induction first, and the same suggestions following a hypnotic induction, second. There was no counterbalancing of the order of non-hypnotic and hypnotic assessment of suggestibility. Moreover, all the participants in these studies knew that they were participating in a study that involved hypnosis from the start, and were aware that their responses to suggestions

without hypnosis were being compared to their responses to suggestions during hypnosis. This may have affected the participants' responses in either context as it has been argued that some participants may hold back their responses, whether deliberately or unconsciously, to suggestions in a non-hypnotic context, if they know there responses are being compared with their responsiveness during hypnosis. Equally, participants may exaggerate their responses during hypnosis, if they have been previously assessed in the absence of hypnosis. (Zamansky, Scharf & Brightbill, 1964).

There is also a problem regarding the measurement of responses to suggestions by these studies. All three studies only measured behavioural responses, and failed to measure: (i) involuntariness and (ii) the subjective experiences associated with the suggestions used. As mentioned in Chapter 1, the experience of involuntariness is often cited as one of the hallmarks of a true response to a suggestion (e.g. Lynn, Rhue & Weekes, 1990). A necessary characteristic of a communication to be termed a suggestion is that the suggested behaviours and experiences are accompanied by a feeling of involuntariness – the 'classic suggestion effect' (Weitzenhoffer, 1953, 2000). Communications intended to be suggestions could easily be responded to voluntarily and as these studies only assessed behavioural responses to suggestions, they were wide open to false positive scoring.

Similarly, subjective experiences are fundamental to responses to suggestions. The essence of the phenomena produced in response to suggestions does not lie in participants' behavioural responses (e.g. moving an arm up in response to an arm levitation suggestion), but in their ability to experience what is suggested (e.g. arm feels as light as a feather), and more importantly, that their experience was involuntary or automatic. It could be argued that in the absence of suggested alterations in involuntariness and subjective experience, behavioural responses to suggestions could simply be due to compliance, thus emphasising the importance of measuring involuntariness and subjective experience.

3.3.2. Braffman & Kirsch (1999)

Perhaps due to the prevailing beliefs at the time, these caveats seem to have been ignored and the association between hypnotic and non-hypnotic responsiveness to suggestion was not directly investigated again for another 30 years. However, in the late 1990s Braffman and Kirsch (1999) re-examined the issue in a study that addressed many of the problems with the earlier studies. Firstly, the order of assessment was counterbalanced, with non-hypnotic suggestibility assessed before or after hypnotic suggestibility. Participants were also not informed about the second suggestibility assessment until the first had been completed, and therefore participants were aware of the comparison during the second trial and not the first. Secondly, the degree to which participants felt the subjective effects called for in each suggestion (i.e. subjective experience) was measured, in addition to behavioural responses, as measured by earlier studies. Subjective experience was scored out of 21, i.e. measured on a scale of 0-3 for each of the seven suggestions. They also used a considerably larger sample, (92 participants, exp 1; 170 participants, exp 2), compared to the relatively small samples used in previous studies (30-44 participants).

Braffman & Kirsch (1999) administered the seven standardised test-suggestions of the Carleton University Responsiveness to Suggestion Scale (CURSS: Spanos et al., 1983) twice, once before a hypnotic induction and once without a hypnotic induction, patterned after the methodology of previous studies. Consistent with previous research, Braffman and Kirsch (1999) found a small but significant overall increase in behavioural responses, with a mean change of 0.9 suggestions (experiment 1). Similarly, there was a small but significant increase in subjective experience scores, with a mean increase of 2.43. However, this increase was moderated by the order in which hypnotic and non-hypnotic suggestibility had been assessed. The order affected responsiveness to non-hypnotic suggestion, although it did not appear to affect responsiveness to suggestions in a hypnotic context. When participants' non-hypnotic suggestibility was assessed first (i.e. not aware that they would be assessed later in a hypnotic context), their mean change in behavioural responses was 0.36

suggestions. This was markedly different from the mean change in behavioural responses for participants who had been given the hypnosis condition first, of 1.43 suggestions. The results were consistent with Zamansky et al's (1964) hypothesised hold-back effect, with participants who had been assessed in hypnosis first, responding to fewer non-hypnotic suggestions than those who had received non-hypnotic suggestions first (0.92 non-hypnotic suggestions vs. 1.89 non-hypnotic suggestions). A similar pattern of results was found for subjective experience scores.

Braffman and Kirsch (1999) concluded that the participants in their study whose non-hypnotic suggestibility was assessed prior to hypnosis and without knowing that there would be a second test, would provide a more accurate indication of the effects of inducing hypnosis. With the data from experiment 1 indicating a non-significant effect of hypnosis when non-hypnotic suggestibility was assessed prior to hypnotic suggestibility, Braffman and Kirsch (1999) carried out a second experiment with a much larger sample of 170 participants, with all participants receiving non-hypnotic suggestions prior to hypnosis. Participants were not informed that hypnosis would be induced until after non-hypnotic responding had been assessed. In contrast to the data from experiment 1, data from experiment 2 using a larger sample indicated a significant effect for the hypnotic induction. However, the effect was relatively small with mean increase in: (i) behavioural responses of 0.53 suggestions; and (ii) subjective experience scores of 0.89. Forty-three (25%) participants reported a decrease in behavioural responses following a hypnotic induction, 50 (29%) reported no change, and of the 77 (46%) exhibiting greater behavioural responses, 40 (24%) showed relatively large increases (2 or more suggestions on a 7-suggestion scale). The frequency distribution of subjective scores followed a similar pattern, with 51 (30%) participants reporting less change, 42 (25%) reporting no change, and 77 (45%) reporting greater change[8] in subjective experience following induction of hypnosis.

[8] The number of participants that reported relatively large increases in subjective experience scores could not be determined from the data included in the original paper.

Recently, Poulsen and Matthews (2003)[9] replicated the study by Braffman and Kirsch (1999) with 44 child psychiatric patients. Non-hypnotic and hypnotic suggestibility was measured using the Stanford Hypnotic Clinical Scale for Children (SHCS-C: Morgan & Hilgard, 1978-1979b), which consists of five suggestions. Scoring on the SHCS-C is dependent on the judgement of the administrator providing a 0-5 range of scores (i.e. a behavioural measurement). Participants were tested individually, and based on Braffman and Kirsch's (1999) recommendation, non-hypnotic suggestibility was assessed prior to hypnosis, with no knowledge of the second test. Poulsen and Matthews (2003) found the mean behavioural score for non-hypnotic suggestibility to be 4.30 suggestions. With a hypnotic induction, the mean score increased to 4.93 suggestions, demonstrating a small increase in suggestibility. Poulsen and Matthews (2003) concluded that these findings were equivalent to those reported earlier by Weitzenhoffer and Sjoberg (1961) and Kirsch and Braffman (1999). Nevertheless, it is important to note that this modest increase in suggestibility may be due to a ceiling-effect imposed by this scale. The mean score for non-hypnotic suggestibility was 4.30 out of a possible 5.0, and consequently the scale may have imposed a highly restrictive ceiling on hypnotic suggestibility (with the mean hypnotic suggestibility score nearly reaching the maximum).

The results reported by Braffman and Kirsch (1999), are supportive of those of previous studies (Barber & Glass, 1962; Hilgard & Tart, 1966; Hull, 1933; Weitzenhoffer & Sjoberg, 1961), indicating that the effect of inducing hypnosis on suggestibility is small, though significant and consistent. Their data also importantly highlighted that a substantial minority of participants (25%) are more responsive to suggestions when not hypnotized. These findings characterise this negative effect on suggestibility as occurring in a higher proportion of individuals than reported in earlier studies. For example, among the samples assessed by Weitzenhoffer and Sjoberg (1961) and Barber and Glass (1962), only 4.5% and

[9] This study is not included in the general review of studies as the population (i.e. child psychiatric patients) and scale (SHCS-C) used differed significantly from those used in previous research. This study is merely briefly considered here simply for 'completeness' of the literature being examined.

13% of participants respectively, displayed fewer responses in the hypnotic condition than in the non-hypnotic condition. Although, taken together these studies (i.e. Barber & Glass, 1962; Braffman & Kirsch, 1999; Hilgard & Tart, 1966; Weitzenhoffer & Sjoberg, 1961) do indicate that the increase in suggestibility is of moderate average amount; for the 50% (approximately) of participants that show an increase in suggestibility following hypnosis, half of those show an increase that is very great indeed.

3.3.3. The 'true' effect of hypnotic inductions

Although, previous research, characterises the increase in suggestibility produced by hypnotic inductions as being small, but significant, this is not a true reflection of the efficacy of hypnotic inductions, as the size of the experimental effect has not been considered (Kirsch, 1997). Whereas statistical tests of significance inform us of the likelihood that experimental results differ from chance expectations, effect size measurements allow us to calculate the relative magnitude of an experimental treatment (Rosnow & Rosenthal, 1996). In other words they tell us the *size* of the experimental *effect*. Despite, Cohen's seminal work on the utility of effect sizes researchers continue to focus on *p* values to the exclusion of effect sizes (Cohen, 1992)

Cohen's criteria that identify effect sizes of 0.20 as small; 0.50 as medium; and 0.80 as large, provide a known and established benchmark against which to compare an experiment's effect size. The mean effect sizes of the induction of hypnosis on suggestibility (excluding Braffman & Kirsch, 1999) vary from 0.63 to 0.82, which results in a mean weighted effect size of 0.69 (see Tables 3.1 and 3.2). If we consider that the mean effect size for psychological treatments in general is 0.47 and the mean effect size of medical outcomes (other than mortality) ranges from 0.24 to 0.80 (Lipsey & Wilson, 1993), the effect of the induction of hypnosis on suggestibility is substantial. These calculations are consistent with the mean effect size of adding hypnosis to cognitive behavioural therapy which is 0.52 (Kirsch, Montgomery & Sapirstein, 1995), and the substantial data on the clinical efficacy of

hypnosis as an adjunct to psychological and pharmacological therapies, which has been shown for many different conditions, including those which can be functional or psychosomatic in origin, or at least exacerbated by anxiety, stress or psychological factors (e.g. Lang, Benotsch, Fick, Lutgendorf, Berbaum, Berbaum, Logan & Spiegel, 2000; Montgomery, DuHamel & Redd, 2000; Patterson & Jensen 2003)

3.3.4. Group administered vs. individually administered

The mean effect sizes of the induction of hypnosis on suggestibility for the Braffman & Kirsch (1999) study, however, paint a less impressive picture. The mean effect size for experiment 1 was 0.55, which is similar to those reported in previous studies. Nevertheless, as mentioned earlier, the effect was moderated by the order in which hypnotic and non-hypnotic suggestibility assessed. The issue of the hold-back effect was addressed in experiment 2, which resulted in mean effect size of 0.30, a contrastingly smaller experimental effect compared to those of previous studies.

Apart from the improvement in experimental design another key difference between the Braffman and Kirsch (1999) study and previous ones, was that Braffman and Kirsch administered their suggestions in groups, using a group scale (CURSS; Spanos et al., 1983), as opposed to the individually administered scales and suggestions used by previous studies. Research that has examined the efficacy of group scales compared to individually tested suggestibility measures indicates that group scales introduce a number of problems (e.g. Green, Lynn & Carlson, 1992; Kurtz & Strube, 1996; Moran, Kurtz & Strube, 2002; Register & Kihlstrom, 1986). As Moran et al., (2002) observed, self-scoring methods used by group scales do not necessarily reflect participants' responses accurately. For many of the responses, participants are required to remember whether they moved their arm or head a certain number of inches. Judging such behavioural responses, which occurred with closes eyes, could prove to be problematic for many. In addition, these judgements rely on accurate long-term memory, as the responses may have occurred up to an hour earlier. In

contrast, for individually administered scales the experimenter usually measures participants' behavioural responses immediately, and therefore memory-based error is minimal for both the participants and the experimenter.

Responses to group administered scales are also more open to distortion due to the nature of social interaction. Participants may be influenced by peer comparison and facilitation, and consequently responses may be inflated or understated depending on the dynamics of the group setting. Register and Kihlstrom (1986) posit that the subtle nuances of the hypnotic experience cannot be measured or examined in a group setting, with some participants not knowing how to label their experiences using self-scoring, and consequently the best way to examine participants' responses is to ask them. The problems with group administered scales are widely recognised (e.g. Bowers, 1993; Moran et al., 2002), with groups scales such as the WSGC (Bowers, 1993; 1998) and HGSHS:A (Shor & Orne, 1962) being considered inadequate replacements for their parent individually administered scales such as the SHSS:C (Weitzenhoffer & Hilgard, 1962). Nevertheless the relative effect of group scales on suggestibility as compared to the effect of individually administered scales on suggestibility has not been investigated, and a definitive answer to as to whether the mean effect sizes of the induction of hypnosis on suggestibility is lower when suggestibility is measured in a group setting as opposed to individually is still lacking.

3.4 General conclusions and outline of empirical chapters

Overall, it seems fair to conclude that after decades of research, it is still impossible to independently determine whether an individual is 'hypnotized', or in a hypnotic state. The phenomena and effects that are usually attributed to hypnosis and a hypnotic state, may be more accurately described as 'suggested' effects, as research indicates that most of these responses and experiences can be elicited without a hypnotic induction, and some of them can be produced easily by the vast majority of people outside hypnosis.

Given the stability of 'hypnotizability' scores measured on the standardised hypnosis scales, it seems surprising that research has failed to find correlates that account for a substantial proportion of the variance in the natural occurrence of responsiveness to hypnotic suggestion. As argued earlier, the term hypnotizability is a misleading label (Kirsch & Braffman, 2001), and strictly speaking 'hypnotizability' (as measured by so-called hypnosis scales) is the change in suggestibility produced by inducing hypnosis. The fact remains that non-hypnotic suggestibility is the only variable that substantially predicts hypnotic responsiveness, typically accounting for about 45 % of hypnotic suggestibility. However this does not explain 'hypnotic' suggestibility.

So what can we say with little doubt about the hypnotic state and the hypnotic induction procedures which are presumed to induce 'hypnosis'? It is worrying for the field of hypnosis research perhaps, but probably the only thing we can say with any conviction, is that hypnotic induction procedures appear to enhance suggestibility in some cases. The data that exist are based on studies in which the same suggestions were given with and without prior induction of hypnosis. Nevertheless, it is worth keeping in mind that, as the review of previous work indicates, the effect of the induction of hypnosis on suggestibility is substantial, comparable to psychological treatments in general and medical outcomes.

However, suggestibility is not hypnotizability, and unfortunately almost all studies that have professed to measure hypnotizability have neglected to control for non-hypnotic suggestibility, and many subjects that have supposedly been highly hypnotisable, may have simply been highly suggestible. It is also important to note that suggestibility as an index cannot tell us for certain whether an individual is hypnotized or non-hypnotized, and although enhanced suggestibility may indicate that an individual is in a hypnotic state, any conclusions based on suggestibility measures with regard hypnosis are only strictly inferences.

Although the experience of involuntariness and the classic suggestion effect (Weitzenhoffer, 1953) is widely recognised as being the hallmark of a hypnotic response, the measurement

of experienced involuntariness is mainly ignored, which is one of the most significant weaknesses of previous studies, including the most recent ones.

Data on the nature and role of hypnotic inductions is still somewhat lacking, which is surprising given that inductions are communications intended to elicit hypnotic phenomena (Edmonston, 1991). With healthcare turning to the effects of the clinical efficacy of hypnosis as an adjunct to psychological and pharmacological therapies (e.g. Kirsch et al., 1995; Patterson & Jensen 2003) and its cost saving role, and mainstream psychology using hypnosis as a tool to study cognitive phenomena, it is fundamental that the necessity for hypnotic inductions, and mechanisms by which they exert their influence be established. This will be the focus of this thesis. More specifically, it will consider which of the independent variables subsumed under the label of 'hypnotic induction' are instrumental and which are extraneous.

To answer this question it is necessary to identify each independent variable. Broadly speaking there are four main elements that distinguish a hypnotic induction from similar procedures such as relaxation procedures. First, the 'typical' hypnotic induction includes, in addition to mental and physical relaxation, specific instructions for the participating individual to become absorbed or focussed on their internal experience (Roche & McConkey, 1990). Instructions for absorption tend to take the form of active attentional focussing (e.g. 'focus and narrow your attention as much as you can'). Second, the 'typical' hypnotic induction includes instructions to avoid thinking critically about any behaviours suggested during a hypnotic situation (e.g. 'don't think about what is happening, just let it happen') – an absence of monitoring, judging and interpreting (Cardena & Spiegel, 1991). Third, the hypnotic induction is distinctive in that it is explicitly labelled as 'hypnosis' – participants' perceptions are therefore influenced by their lay beliefs, expectations and motivations concerning hypnosis and its effects on behaviour and experience (Spanos, 1982). Finally, hypnotic inductions explicitly request certain activities (e.g. 'close your eyes and relax') and then proceed to suggest the same responses (e.g. 'your body is feeling very

relaxed'). Requests and suggestions differ in their depiction of behavioural causation. Briefly, a request (e.g. 'please raise your arm') defines the recipient as the source of action, whereas a suggestion (e.g. 'your arm is rising') defines a source external to the self as the cause of action.

The chapters of the thesis will now proceed as follows. Chapter 4, the initial empirical chapter, will examine whether there is bodily asymmetry in responses to suggestions. Although this chapter does not directly investigate the nature and role of hypnotic inductions as outlined above, lateralisation of response to suggestion and the notion that one side of the body may be more responsive to suggestion, has important implications on how non-hypnotic and hypnotic suggestibility will be measured in the rest of the thesis. Chapters 5 and 6 will investigate the effects of absorption and reduced critical thought on responses to suggestions. Chapter 7 will examine the label 'hypnosis' and determine the extent to which responses to suggestion are affected by the induction technique itself or/and the perception that a hypnotic procedure is being carried out. Chapter 8 will explore the effects that compliance to prior requests has on responsiveness to suggestion. Finally, Chapter 9 will integrate the data and suggest directions for further research.

Chapter 4

Study 1: Is There a Lateral Asymmetry in Bodily Response to Suggestion?

Chapter overview

Hypnotic suggestibility scales often include suggestions involving directions for responses on a specific side of the body, which as a result may influence the scores obtained by them. The idea that one side of the body is more responsive to suggestions has important implications for the methodology used in this thesis, as well as the efficacy of hypnosis and suggestion in some forms of therapy. This first empirical chapter therefore, examines lateral differences in bodily response to suggestion.

4.1. Introduction

The notion that hypnosis is related to lateralised brain function has a long history, but remains controversial. Both the right (Bakan, 1969; Gur & Gur, 1974; Morgan, Macdonald & Hilgard, 1974) and the left (Jasiukaitis, Nouriani, Hugdahl & Spiegel, 1997) hemispheres have been proposed as the neurophysiological mediator of the hypnotic experience. Taken together, Crawford and Gruzelier (1992; Crawford 1994; Gruzelier 1996, 1998) have arguably yielded the most influential developments in the understanding of within-hemisphere dynamics during hypnosis. Specifically, they posit that hypnosis involves a shift from an analytical to a holistic style of thinking characterised by activity shifts from the left to the right hemisphere during hypnosis.

4.1.1. Hypnosis as a right-hemisphere function

Early evidence of right hemisphere mediation of responsiveness to hypnotic suggestions stems, in the main, from studies of lateral eye movements, lateral bias in classroom seating and EEG alpha.

Bakan (1969) first introduced the notion of direction of conjugate lateral eye movements as an index of hemisphericity. He also suggested that these movements were a reliable correlate of hypnotic suggestibility, and found that people who consistently moved their eyes to the left (i.e. left movers), when face-to-face with an examiner, were more hypnotically suggestible than right movers. It was later discovered that left and right movers differed in their self-reported preferences for classroom seating. Left movers preferred to sit on the right side of classrooms, whereas right movers preferred the left side (Gur, Gur, & Marshalek, 1975). The finding that left movers and individuals with right-side seating habits[10] have higher levels of hypnotic suggestibility than right movers and individuals with left-side seating habits has been reported in several studies (Gur & Gur, 1974; Gur & Reyher, 1973; Sackeim, Paulhus & Weiman, 1979). Apart from these studies, however, evidence concerning the right-hemisphere and hypnotic suggestibility has been contradictory (DePascalis & Penna, 1990).

Morgan, McDonald and Macdonald (1971) made what appears to be the first attempt to relate alpha states with hypnotic suggestibility. They used what they called 'right hemisphere spatial tasks' and 'left hemisphere verbal tasks', which were presumed to activate the right or left hemispheres respectively. They found no relationship between right-hemisphere alpha and hypnotic suggestibility, with no differences in right hemisphere alpha between high and low hypnotic suggestibles. The effect of task type was also found to have no effect on right/left alpha proportion, which may be a consequence of the tasks employed, as there was very little empirical evidence to suggest that these tasks actually selectively activated the right

[10] Both taken to be indices of right hemispheric activation

or left hemisphere (Jasiukatis et al., 1997). Replications by Morgan, Macdonald & Hilgard (1974) and MacLeod-Morgan and Lack (1982) failed to find any reliable relationships between hemispheric alpha states and hypnotic suggestibility.

Although there are indications from these early studies of some relationship between the right hemisphere and hypnotic suggestibility, the evidence remains insufficient to definitively establish the nature of the relationship. Gruzelier (1998) points out that many of these studies are methodologically flawed and can be criticised due to their lack of standardisation and their failure to consider the responses of low suggestible participants.

4.1.2. Hypnosis as a sequence of left followed by right hemisphere function

More recently, a number of methodologically sound studies have been carried out in support of the neuropsychophysiological model of hypnosis (see Crawford & Gruzelier, 1992; Gruzelier, 1998 for reviews) and the idea that hypnosis involves a shift towards more holistic, right hemisphere oriented processes. A study by McCormack and Gruzelier (1993), for example, using a signal detection paradigm reported an association of right hemispheric changes with high hypnotic suggestibility. They found that high but not low hypnotically suggestible individuals showed significant visual processing improvement in the left visual field (i.e. right hemisphere) during hypnosis. Gruzelier and Brow (1985) demonstrated that in high hypnotically suggestible participants habituation of electrodermal responses was faster to tones during hypnosis than in a non-hypnotic baseline, whilst the reverse was found in low hypnotically suggestibles. The electrodermal responses in highs were found to be significantly lower on the left hand (i.e. right hemisphere) during hypnosis than in baseline, indicating a shift in lateralisation from left hemispheric influences in non-hypnotic baseline to right hemispheric influences in hypnosis. However, low hypnotically suggestibles did not show this difference. Studies showing that right hemisphere oriented processes during hypnosis are accompanied by the inhibition of the critical faculties of the left hemisphere also provide strong support for the holistic-shift hypothesis. Gruzelier, Brow,

Perry, Rhonder and Thomas (1984), for example, using a haptic processing task found that high hypnotically suggestibles showed a significant slowing in right hand (i.e. left hemisphere) sorting times following the induction of hypnosis, with the degree of slowing correlating significantly with hypnotic suggestibility level. Cikurel and Gruzelier (1990) replicated these findings using an active-alert induction procedure (Banyai and Hilgard, 1976).

The essence of Crawford and Gruzelier's model (1992; Crawford, 1994; Gruzelier, 1998) and the findings of the vast programme of supporting work is that hypnosis is a three-stage process. Firstly, during the induction of hypnosis there is focussed attention on the words of the hypnotist with disattention to extraneous stimuli, which engages the supervisory attentional system of the frontal lobes, primarily in the left hemisphere. Secondly, once attention has been sufficiently engaged, and the individual is deeply absorbed in the hypnotic experience, suggestions for relaxation and/or 'letting go' and 'going with the flow' bring about a left-frontal inhibition. This corresponds to a shift away from more analytical modes of processing to more holistic processing. Finally, any further use of suggestions (e.g. for therapeutic or experimental work) engages posterior cortical sites, primarily in the right hemisphere.

As Jasiukaitis et al., (1997) point out, contrary to the early view that hypnosis was characterised by right hemisphericity, the programme of work by Crawford and Gruzelier and their neuropsychophysiological model denies the exclusive role of the right-hemisphere in hypnosis. There are aspects such as focussed attention, which have often been cited as being essential to hypnosis, which are more commonly associated with left-hemispheric processes Moreover, the model describes hypnosis as a sequence of left-hemisphere followed by right-hemisphere activation which is consistent with the lack of evidence that individuals rely on one hemisphere for a variety of cognitive tasks, with most cognitive activity consisting of stages, which subsequently correlate with the activation of different parts of the

brain (Gruzelier, 1998). The evidence suggests that viewing hypnosis solely as a function of one or the other hemisphere could be a gross oversimplification.

4.1.3. Parallels between conversion disorder symptoms and suggested effects

The notion that responses to suggestions and the medically unexplained symptoms of conversion hysteria are inextricably linked, stems from the writings of Janet. He described 'suggestion [as] a precise and relatively rare phenomenon; [which] presents itself experimentally or accidentally only with hystericals, and, inversely, all hystericals, when [studied] from this standpoint, present this same phenomenon in a higher or lower degree' (Janet, 1907/1929, p. 292). This view was developed by Babinski, who emphasised that the essential feature of hysteria was abnormal suggestibility (Babinski & Froment, 1918), and has continued in theoretical discussions to the present (Bryant & McConkey, 1999; Hilgard, 1977; Kihlstrom, 1992; McConkey, 2001; Oakley, 1999b, 2001; Roelofs, Hoogduin, Keijsers, Naring, Moene & Sandijk, 2002).

Oakley (1999b) outlines a number of similarities between suggested phenomena and the symptoms of hysteria, and goes on to propose that they may depend on similar neurophysiological mechanisms. A recent study by Roelofs, Keijsers, Näring, Hoogduin, Moene and Sandijck (2002) provides initial support for this. They compared patients with conversion disorder with matched control patients and found conversion patients to be significantly more responsive to hypnotic suggestions than the controls. In addition, there was a significant correlation between responsiveness to hypnotic suggestions and the number of conversion symptoms in conversion patients. Further supporting evidence comes from neuroimaging. Halligan, Athwal, Oakley and Frackowiak (2000) found in a single-case study, using PET (Positron Emission Tomography), that a hypnotic suggestion for paralysis activated similar brain areas to those found in conversion disorder paralysis (Marshall, Halligan, Fink, Wade and Frackowiak, 1997). Nevertheless, studies in this area are few in number and the related predictions that patients with conversion disorder are

more responsive to suggestions when compared to a control group and that the same patterns of brain activity should be seen with hypnotically suggested effects as compared to the corresponding conversion symptom, remain relatively untested.

4.1.4. Lateralisation of conversion disorder symptoms

If conversion disorder symptoms have psychological, and possibly neuropsychological, mechanisms in common with suggested 'hypnotic' phenomena in general, a strong prediction is that they should show common patterns of lateralisation in their expression.

Traditionally, the functional or 'psychogenic' motor and sensory symptoms of conversion disorder have been reported to be unilateral, with the preponderance of symptoms occurring on the left side. (e.g. Briquet, 1859; American Psychiatric Association, 1994; Galin, Diamond & Braff, 1977; Pascuzzi, 1994; Sierra & Berrios, 1999; Stern, 1977). Possible explanations for this predominance of symptoms on the left side of the body, have included hemispheric specialization, with the non-dominant hemisphere having a leading role in the pathogenesis of symptoms, and the 'convenience hypothesis' that a dysfunction on the non-dominant side is easier to 'maintain' and has less of a detrimental effect on everyday life. However, other studies have failed to confirm this left-sided predominance (e.g. Bishop, Mobley & Farr, 1978; Keane, 1989; Roelofs, Naring, Moene & Hoogduin, 2000; Stefansson, Messina, & Meyerowitz, 1976;) or have found symptoms to occur more commonly on the right side (e.g. Fallik & Sigal, 1971; Regan & LaBabera, 1984)

A recent systematic review of 121 studies, involving 1139 patients, investigated this long held belief that functional motor and sensory symptoms occurred more frequently on the left (Stone, Sharpe, Carson, Lewis, Thomas, Goldbeck, Warlow, 2002). Basing their conclusion, on the pooled results, they found that 58% of patients had functional weakness, sensory symptoms or both on the left side of their bodies. Although, the overall results showed a slight left lateralizing effect, this does not reveal the whole picture. On re-analysis by study type, the proportion of left sided symptoms rose to 66% in studies in which the

title referred to laterality, compared to 53% of patients where laterality was measured incidentally. This indicated an outcome variable reporting bias, with the data from 'headline studies' more likely to be consistent with the hypothesis that functional weakness and sensory symptoms are more common on the left than the right, compared to the incidental laterality data from 'non-headline' studies. Stone et al (2002) concluded that their review provided little support for the hypothesis that functional weakness and sensory symptoms are more common on the left than the right. They suggested that the long held belief that functional weakness and sensory symptoms occur more commonly on the left may have been due to the outcome variable reporting bias they found.

Stone et al., also analysed studies on functional movement disorder (tremor, dystonia, myoclonus) separately and in contrast with the data on functional weakness and sensory symptoms, functional or 'psychogenic' movement disorder were found to occur in 68% of patients on the right side. They speculated that 'active' motor symptoms may be more prevalent on the right. However, the data currently available are insufficient to answer this question definitively. Based on the results of Stone et al.'s systematic review and the conflicting findings of previous studies, there is no compelling evidence that conversion disorder is characterised by symptom lateralisation.

4.1.5. Lateralisation of responses to 'hypnotic' suggestions

As far as the author is aware only two studies have addressed the effect of laterality on responsiveness to 'hypnotic' suggestions. Sackeim (1982), following up the observations made by numerous earlier studies (e.g. Galin et al., 1977; Stern, 1977) that symptoms of conversion disorder were more frequently found on the left, found that subjects given hypnotic ideomotor suggestions responded more strongly on the left side of their bodies. Although the difference was statistically significant, it was very small. A replication of this study by Otto-Salaj, Nadon, Hoyt, Register & Kihlstrom (1992), using almost 15-times the number of subjects as Sackeim, failed to find the asymmetry. The evidence for left lateral

response bias to 'hypnotic' suggestions thus remains inconclusive though, as with conversion symptoms, the weight of evidence seems to be against there being a lateral bias.

So far there is no compelling evidence to assign hypnotic phenomena to either of the hemispheres. Indeed viewing hypnosis as a function of one or the other hemisphere appears to be an oversimplification. Nevertheless, lateralisation of response to suggestion and the idea that one side of the body is more responsive to suggestions has important implications on how non-hypnotic and hypnotic suggestibility are measured in this thesis, as well as the efficacy of hypnosis and suggestion in the treatment of conversion disorders. A third of the items on standardised hypnotic suggestibility scales, such as the Stanford Hypnotic Susceptibility Scale, form C (SHSS:C; Weitzenhoffer and Hilgard, 1962), involve ideomotor or challenge suggestions (e.g. arm immobility; arm levitation) with directions for responses on a specific side of the body. If, as found by Sackeim (1982), participants given motor suggestions respond more strongly on the non-dominant side of their bodies[11], subjects' responsiveness to suggestion could be a function of whether the suggestion is directed towards a specific side of the body.

4.1.6. Study objectives

In view of the contrasting and inconclusive results of previous research, the current study aimed to directly address the issue of whether there is a lateralised response to typical 'hypnotic' suggestions. It investigated (i) the reports that response to test suggestions occur more strongly on the left sides of subjects' bodies and (ii) the possibility that responsiveness to suggestion is related to handedness. Previous studies have used lateralised test suggestions comparing responsiveness to right and left versions of suggestions either within-subjects (Sackeim, 1982) or between-groups (Otto-Salaj et al., 1992). However, to establish definitively whether there is a lateralised response to suggestion no reference should be

[11] Right-handed subjects being more responsive to hypnotic suggestions on the left side of their bodies, whilst in contrast, left-handed and ambidextrous subjects being more responsive on the right side their bodies.

made to the side on which responsiveness should occur. In the present investigation, the suggestions used were not lateralised and made no reference to responses on a specific side of the body. This allowed a systematic evaluation of whether there was a lateral response bias to 'hypnotic' suggestions and whether it was related to handedness. Participants were tested individually with either an ideomotor or a challenge suggestion measure and behavioural, subjective, and involuntariness ratings were obtained.

In contrast to the studies by Sackeim (1982) and Otto-Salaj et al (1992) it was decided not to use a hypnotic induction procedure, or to pre-select participants of high hypnotic responsiveness, but to investigate the effects of suggestion in non-hypnotised individuals. This decision was based on seven main considerations: (a) the large body of research demonstrating that the majority of typical 'hypnotic' phenomena can be produced without a hypnotic induction; (b) the observation that the suggestions to be used are consistently 'passed' by the majority of subjects on the behavioural and subjective criteria of standardised hypnotic suggestibility scales; (c) there is a very high correlation between non-hypnotic suggestibility and hypnotic suggestibility as measured by standardised suggestibility scales (see Braffman & Kirsch, 1999); (d) the view that non-hypnotic and hypnotic suggestibility are in reality the same phenomenon ('imaginative suggestibility', Kirsch 1997; also see Chapter 1, section 1.9) measured under two different conditions; (e) evidence that hypnotic inductions enhance suggestibility only for some individuals, with the mean levels of responsiveness to suggestion increasing to only a very modest degree; (f) the importance to the methodology used in this thesis of responsiveness to 'hypnotic' suggestions in a non-hypnotic context; and finally (g) whilst it is claimed that they are produced by suggestion there is no evidence that the parallel phenomena in conversion disorder are the product of a formal hypnotic induction.

On the basis of the evidence reviewed above, it was not expected that significant differences would be found in response strength on the left compared to the right side of subjects' bodies, irrespective of handedness. However, these same data allowed the possibility of a

slight right lateralizing effect for the 'active' ideomotor suggestion, and a slight left lateralizing effect for the 'passive' challenge suggestion.

4.2. Method

4.2.1. Participants

The present study was based on a total of 312 participants who volunteered for a study concerned with individual responsiveness to spoken suggestion. Equal numbers of participants were randomly allocated on the day of assessment to one of the two experimental conditions: Arm Levitation or Arm Immobility. The Arm Levitation sample consisted of 72 males and 84 females, with an average age of 23.51 years (SD = 8.89 years; range 18-53 years). A total of 139 (89.1%) identified themselves as right-handed and 17 (10.9 %) as left-handed. The Arm Immobility sample consisted of 67 males and 89 females, with an average age of 25.61 years (SD = 10.66 years; range 18-59 years). A total of 134 (85.9%) identified themselves as right-handed and 22 (14.1%) as left-handed. The joint UCL/UCLH Committee on the Ethics of Human Research approved this study; informed consent was obtained from all participants.

4.2.2. Measures

4.2.2.1. Responsiveness to suggestion

An Arm Levitation (ideomotor) and an Arm Immobility (challenge) suggestion were used to measure responsiveness to suggestion. These were taken from the Barber Suggestibility Scale (BSS: Barber, 1965) and the Stanford Hypnotic Susceptibility Scale, form C (SHSS:C; Weitzenhoffer and Hilgard, 1962) respectively. For the present experiment, a modified version of these suggestions was constructed in which all reference to the side of the body targeted by each of the original lateralised suggestions was removed (modified ideomotor and challenge suggestions presented in Appendix 4.1). Consequently, the suggestions used

here were non-lateralised and did not target either side of the body. Although these suggestions are ones that have been traditionally used in hypnotic contexts, no formal hypnotic induction was used or any reference to hypnosis made for the reasons outlined in the introduction.

Behavioural, subjective and involuntariness scores were all taken. Behavioural responses were recorded by the experimenter, who observed which hand moved (i.e. left or right) during the responsiveness to suggestion test and how much it moved. For subjective responses, participants were asked to indicate which arm felt: '*light and was moving upwards*' or '*heavy and unable to move*'. The questions were dependent on the group they were in, i.e. referring to arm lightness for those participants in the Arm Levitation sample, and arm heaviness for those in the Arm Immobility sample. Involuntariness scores were taken if participants had produced a response during the behavioural assessment. Involuntariness was measured by asking subjects to rate on a 5-point Likert-type scale, ranging from (1) *completely voluntary* to (5) *completely involuntary,* the degree to which their behavioural response was experienced as involuntary (scoring criteria presented in Appendix 4.2)

Suggestions were recorded onto audio-tape. There were two versions. Version A (5 minutes, 32 seconds) suggested arm levitation, whilst version B (6 minutes, 58 seconds) suggested arm immobility (taped instructions presented in Appendix 4.1). The taped instructions were played to participants on a standard tape recorder placed in the midline in front of them.

4.2.2.2. Handedness questionnaire

This was adapted from the handedness questionnaire by Coren (1992) and used to determine whether participants were right-handed, left-handed or ambidextrous. Participants reported frequency of hand usage for twelve manual tasks (questionnaire presented in Appendix 4.3).

4.2.3. Design and procedure

The study followed an independent sample design. Half the participants were given an ideomotor suggestion to levitate one of their arms (Arm Levitation sample); whilst the other half was given a challenge suggestion that one of their arms was immobile (Arm Immobility sample). Participants were tested individually in a quiet room. They were informed that the experiment involved listening to and following instructions on a tape. They were reassured that they would not be asked to experience or to do anything embarrassing or harmful and could leave the experiment at any time without having to give a reason. It was ensured that participants were sitting as comfortably as possible, symmetrically, and upright with both feet on the floor. They were then instructed to rest their hands on their legs, to close their eyes and to focus all their attention on the tape. Responses to suggestions were then scored behaviourally and subjectively. Finally, participants were asked to complete the handedness questionnaire.

4.3. Results

One hundred and sixteen participants (74.4%) in the Arm Levitation sample (N = 156) were unilateral responders to the arm lightness suggestion, with a bilateral response occurring in 9 participants (5.8%) and 31 participants (19.8%) giving no response behaviourally. One hundred and forty-two participants (91.0%) in the Arm Immobility sample (N = 156) produced a unilateral behavioural response to the arm heaviness suggestion, with 2 participants (1.3%) eliciting a bilateral response, and the remaining 12 participants (7.7%) showing no response.

4.3.1. Arm levitation sample

The lateralised responses for participants in the arm levitation sample are presented in Table 4.1. Fifty-five participants (47%) responded behaviourally, to the arm levitation suggestion, with their right side and 61 participants (53%) responded behaviourally with their left side.

This distribution did not differ significantly from chance [two-tailed binomial test; probability = 0.5: $p = 0.64$]. There were no significant relationships between: (i) response side and gender, χ^2 (2, N = 116) = 0.18, $p = 0.67$; or (ii) response side and handedness, χ^2 (2, N = 116) = 3.48, $p = 0.06$. It may be worth noting that relationship between response side and handedness approaches significance. However, the test is underpowered and consequently no definitive interpretations can be made.

Table 4.1. Lateralisation of responses to the *arm levitation suggestion* according to behavioural and subjective criteria

Handedness	Criterion & Side of Response for *Arm Levitation Suggestion*			
	Behavioural		Subjective	
	Right Side	Left Side	Right Side	Left Side
Right-handed				
Males	23	27	26	33
Females	29	24	34	30
Total	52	51	60	63
Left-handed				
Males	1	2	1	3
Females	2	8	2	7
Total	3	10	3	10
All handedness				
Males	24	29	27	36
Females	31	32	36	37
Total	55	61	63	73

For subjective responses to the arm levitation suggestion, 63 participants (46%) responded with their right side and 73 participants (54%) showed a left sided response. The same pattern of results was found as the behavioural responses to the arm levitation suggestion, with no significant differences in subjective right/left sided responses [two-tailed binomial test; probability = 0.5: $p = 0.44$]. There were also no significant relationships between: (i) response side and gender, χ^2 (2, N = 136) = 0.57, $p = 0.45$; or (ii) response side and handedness, χ^2 (2, N = 136) = 3.12, $p = 0.08$. As with behavioural responses, the relationship between response side and handedness for subjective responses similarly approaches significance. However, the test is again underpowered and consequently no definitive interpretations can be made. Furthermore, participants with left-sided responses to the arm

levitation suggestion did not significantly differ in scores of involuntariness (M = 3.30, SD = 1.26) from participants with right sided responses (M = 3.53. SD = 1.15), $t_{(114)} = 1.03$, $p = 0.30$.

4.3.2. Arm immobility sample

The lateralised responses for participants in the arm immobility sample are presented in Table 4.2. 62 participants (44%) responded behaviourally, to the arm heaviness suggestion, with their right side and 80 participants (56%) responded behaviourally with their left side. This distribution did not differ significantly from chance [two-tailed binomial test; probability = 0.5: $p = 0.15$]. There were no significant relationships between: (i) response side and gender, χ^2 (2, N = 142) = 0.05, $p = 0.82$; or (ii) response side and handedness, χ^2 (2, N = 142) = 0.42, $p = 0.52$.

Table 4.2. Lateralisation of responses to the *arm immobility suggestion* according to behavioural and subjective criteria

Handedness	Criterion & Side of Response for *Arm Immobility Suggestion*			
	Behavioural		Subjective	
	Right Side	Left Side	Right Side	Left Side
Right-handed				
Males	24	27	23	24
Females	31	41	29	41
Total	55	68	52	65
Left-handed				
Males	2	5	2	6
Females	5	7	5	6
Total	7	12	7	12
All handedness				
Males	26	32	25	30
Females	36	48	34	47
Total	62	80	59	77

Subjective responses to the arm immobility suggestion resulted in 59 participants (53%) responding with their right side and 77 participants (43%) showing a left sided response. The pattern of results was the same as the behavioural responses to the arm heaviness

suggestion, with no significant differences in subjective right/left sided responses [two-tailed binomial test; probability = 0.5: $p = 0.15$]. No significant relationships were found between: (i) response side and gender, χ^2 (2, N = 136) = 0.16, $p = 0.69$; or (ii) response side and handedness, χ^2 (2, N = 136) = 0.39, $p = 0.54$. Moreover, participants with left-sided responses to the arm immobility suggestion did not significantly differ in scores of involuntariness (M = 3.33, SD = 1.23) from participants with right sided responses (M = 3.13. SD = 1.49), $t_{(140)} = 0.86$, $p = 0.39$.

4.3.3. 'Classic suggestion effect'

The experience of involuntariness is often cited as one of the hallmarks of a 'true' response to a suggestion (e.g. Lynn, Rhue & Weekes, 1990; Weitzenhoffer, 1953, 2000). Weitzenhoffer claims that a necessary (although not sufficient) condition for a communication to be viewed as a suggestion is that the response to it be accompanied by a feeling of involuntariness, a phenomenon that has been labeled the 'classic suggestion effect'. Accordingly, the data from this experiment were re-analysed considering only those participants who scored '4' or '5' on the 5-point Likert-type scale (1= completely voluntary; 5 = completely involuntary) that assessed the degree to which their behavioural response was experienced as involuntary. The lateralised responses for participants that scored 4-5 on experienced involuntariness for either the arm levitation suggestion or the arm immobility suggestion are shown in Table 4.3.

For the arm levitation suggestion, a total of 66 participants (57% of those that responded behaviourally) experienced their response as involuntary. Thirty-four of those participants responded behaviourally with their right side, whilst 32 participants responded with their left sides. This distribution was not significantly different from chance [two-tailed binomial test; probability = 0.5: $p = 0.90$]. There were no significant relationships between: (i) response side and gender, χ^2 (2, N = 66) = 0.06, $p = 0.81$; or (ii) response side and handedness, χ^2 (2, N = 66) = 1.38, $p = 0.24$

Table 4.3. Lateralisation of involuntary behavioural responses to the arm levitation and arm immobility suggestions

Handedness	Suggestion & Side of Response			
	Arm Levitation		Arm Immobility	
	Right Side	Left Side	Right Side	Left Side
Right-handed				
Males	17	15	13	13
Females	14	11	15	22
Total	31	26	28	35
Left-handed				
Males	1	1	1	4
Females	2	5	3	3
Total	3	6	4	7
All handedness				
Males	18	16	14	17
Females	16	16	18	25
Total	34	32	32	42

For the arm immobility suggestion, a total of 74 participants (52% of those that responded behaviourally) experienced their response as involuntary. Thirty-two of those participants responded behaviourally with their right side and 42 participants responded with their left side. This distribution did not differ significantly from chance [two-tailed binomial test; probability = 0.5: $p = 0.30$]. There were no significant relationships between: (i) response side and gender, χ^2 (2, N = 74) = 0.08, $p = 0.78$; or (ii) response side and handedness, χ^2 (2, N = 74) = 0.25, $p = 0.62$.

4.4. Discussion

The objective of the present study was to determine whether there is a lateralisation of responsiveness to test suggestions typically included in tests of hypnotic suggestibility. As noted above, previous findings are conflicting, showing either a left sided lateralisation (Sackeim, 1982) or no lateralisation in the suggested response (Otto-Salaj et al., 1992). In the present experiment, no substantial evidence of lateralisation of responsiveness to suggestion was obtained for either of the two items tested. Although the pooled results of the participants that produced a unilateral response to the ideomotor or challenge

suggestion indicates a very slight left sided lateralisation, the left-right distribution of responses did not differ significantly from chance. This finding was consistently obtained regardless of whether the response was defined behaviourally, subjectively or by experienced involuntariness. Moreover, no specific subgroups of participants with response lateralisation could be identified. Neither gender nor handedness showed a significant effect on lateralised responses to suggestion. The findings, using a substantial sample size, thus provide support for those previously reported by Otto-Salaj et al., (1992), and fail to confirm the notion that response to suggestions is stronger on the left side of the body.

4.4.1. 'Suggestive' approach vs. use of 'hypnotic' procedures

In evaluating these results, it should be noted that the present study differed in several ways from previous studies that have explored the possible laterality of responses to direct suggestion. Firstly, it used non-lateralised test suggestions, as opposed to lateralised ones, and involved only two different suggestions, compared to nine used by Sackeim (1982) and four used by Otto-Salaj et al., (1992). Nevertheless, using an item-by-item analysis Sackeim (1982) obtained a positive result, whilst in contrast and similarly to the findings of the current study, Otto-Salaj et al., (1992) found a negative result. Perhaps most importantly, the present study used a suggestive approach without a formal hypnotic induction procedure. It could therefore be argued that a lateralisation effect was not found because our participants did not receive 'hypnosis' as defined by engagement with procedures typically identified as hypnotic inductions (Kihlstrom, 1985) or by the achievement of a specific 'hypnotic' state (Hilgard, 1977). However, as we have already noted, most 'hypnotic' phenomena can be produced by suggestion without the use of a formal hypnotic induction or explicit reference to hypnosis (Barber, 1965; Barber & Calverley, 1964) and there is also no proposition that the parallel conversion disorder phenomena with which they are compared as suggestion-based effects are the products of formal hypnosis procedures. Furthermore, the conclusion that a person is in a 'hypnotic' state is usually based on their responsiveness to suggestion following an induction. In the present study

80.2% of participants showed a behavioural response and 87.2% responded subjectively to the arm levitation suggestion; whilst 92.3% responded behaviourally and 87.2% showed a subjective response to the arm immobility suggestion.

Moreover, 57% of the participants in the present study that responded to the arm levitation suggestion and 52% of the participants that responded to the arm immobility suggestion identified their responses as being involuntary. The experience of involuntariness is widely cited as being a hallmark of a 'true hypnotic' response to suggestion, and these percentages are consistent with the percentages of 'hypnotised' subjects that experience their responses to suggestion as involuntary – which range between 25% to 67% (K.S. Bowers, 1981; P. Bowers, 1982; Spanos & Gorassini, 1984; Weitzenhoffer, 1974). Given the high responsiveness to the arm levitation and arm immobility suggestions used, it is doubtful that a formal hypnotic procedure would have affected the results significantly.

4.4.2. Implications for conversion disorder

This study has implications for the parallels that have been drawn between symptoms of conversion disorder and phenomena produced in response to 'hypnotic' suggestions. In particular, both suggested phenomena and conversion disorder symptoms are experienced as 'involuntary' and subjectively 'real', both appear 'faked' when objective tests are applied, and both participants and patients appear to have 'implicit knowledge' that transcends the phenomena/symptoms they display (Kihlstrom, 1994; Oakley, 1999b, 2001). Overall, the findings of this study of suggested effects in normal participants are consistent with those of Stone et al. (2002) in their systematic review of conversion disorder symptoms and further underline a commonality of features between symptoms of conversion disorder and phenomena typically suggested in hypnosis contexts. Specifically, despite earlier assumptions to the contrary, neither appears to be characterised by lateralisation of expression.

The fact that there are similarities between suggested phenomena and conversion symptoms is consistent with, but does not prove, a common neuropsychological mechanism for the two. One potentially powerful source of evidence relating to the possibility of common mechanisms is neuroimaging and the study by Halligan et al., (2000) which found that suggested paralysis activated similar brain areas to those activated in conversion hysteria, provides an experimental paradigm for future studies.

4.4.3. Conclusions

Restricting the neuropsychological underpinnings of hypnosis and hypnotic suggestion to merely a matter of left versus right hemisphere is of course over simplistic. As found by Otto-Salaj et al., (1992), this study provides no evidence of a laterality effect on responsiveness to suggestions. These results have direct implications for the methodology used in the rest of the thesis, and indicate that although hypnotic suggestibility scales often consist of suggestions involving directions for responses on a specific side of the body, lateralised test items would not be expected to influence the scores obtained by them. Consequently, the lateralised test items contained in standardised hypnotic suggestibility scales will be used in their original form to measure responsiveness to suggestions in both non-hypnotic and hypnotic contexts in the remaining studies to be reported in this thesis.

Chapter 5

Study 2: Effects of Absorption and Reduced Critical Thought on Responses to Suggestion

Chapter overview

Evidence presented in the previous chapter answered an important question relating to possible lateral biases in measures used to assess changes in suggestibility in the remaining studies reported here. This chapter is the first of four that directly investigate the nature and role of hypnotic inductions and the independent variables subsumed under the label of 'hypnotic induction' outlined at the end of Chapter 3. This chapter explores the notion that absorption and reduced critical thought are instrumental in how inductions exert their influence.

5.1. Introduction

The concepts of hypnosis and suggestion have been inextricably linked since the late nineteenth century (Gheorghiu, 1989a). As discussed in the introductory chapters a very significant observation is that of the consistently very high correlation between so-called non-hypnotic and hypnotic suggestion (Kirsch, 1997; Kirsch & Lynn, 1997). A parsimonious interpretation of these findings would be that non-hypnotic and hypnotic suggestions are governed by the same basic causal mechanisms (see Kirsch & Lynn, 1997). Nevertheless, it is also evident from empirical research that an individuals' response to suggestion may be significantly increased by the induction of hypnosis, a change that is more than comparable in its effect size to psychological treatments in general and a range of medical outcomes (see Chapter 3).

5.1.1. How do hypnotic inductions facilitate responses to suggestion?

Theories of hypnosis disagree over why suggestibility increases during hypnosis. The 'generic non-state' view, as taken by socio-cognitive theorists, argues that it is the unusual nature of the hypnotic situation and the beliefs and attitudes associated with it, which are likely to have a profound role in shaping the character and occurrence of behavioural experiences such as increases in suggestibility (e.g. Barber, 1969; Kirsch, 2000a; Sarbin & Coe, 1972; Spanos, 1986; Wagstaff, 1981). In contrast, the ego-psychological and dissociation theorists within the 'generic state' view (e.g. Bowers, 1992; Fromm, 1979, 1992; Woody & Bowers, 1994) argue that increased suggestibility during hypnosis is due to the implementation of a special state of psychological functioning characterised by unique cognitive, behavioural, phenomenological and physiological processes. The source of the increase of suggestibility during hypnosis remains controversial, and although there is a vast amount of empirical research that lends credence to the various positions, there has been very little explicit recognition of the relative influence of the hypnotic induction, which is surprising given that inductions are communications intended to elicit hypnotic phenomena (Edmonston, 1991). However, the pioneering work of Price, Barrell, Rainville and colleagues, provides potentially useful insights on how the induction of hypnosis changes experience and increases suggestibility, of which will now be discussed.

5.1.1.1. The experiential-phenomenological approach

The experiential paradigm of Price and Barrell (1980) is one that is increasingly being cited as elucidating the experiential dimensions of various conditions including anxiety (Barrell, Madieros, Barrell & Price, 1985); emotion (Price & Barrell 1984; Price, Barrell & Barrell, 1985); pain (Price, 1999; Price, Barrell & Rainville, 2002); and particularly relevant to this discussion the phenomenal experience that characterises the feeling of being 'hypnotised' (Price, 1996; Price & Barrell, 1990; Rainville et al., 1997; Rainville et al., 2002; Rainville & Price, 2003; Sheehan, 1992). The experiential-phenomenological approach (Price & Barrell, 1980) utilises first-person and third person perspectives to discover the common

dimensions and interrelationships within specific types of experiences, and consists of four main stages: (i) questioning and observing; (ii) describing experiences from a first-person perspective; (iii) understanding experiences through discovering common factors and their interrelationships; and (iv) application of quantitative methods to tests relationships between common factors (Price et al., 2002).

Two studies using this experiential-phenomenological approach have directly examined the common elements that comprise the experience of being 'hypnotised' or being in a 'hypnotic state'. Price and Barrell (1990) identified, among other dimensions, (i) a feeling of deep relaxation and mental ease (i.e. 'letting go'; becoming at ease); (ii) absorption and focussed attention; (iii) an absence of judging, monitoring and censoring; (iv) a suspension of usual orientation; and (v) experience of one's own responses as automatic. In addition they proposed that some of the dimensions were necessary for the emergence of others and formulated a model of these interrelationships. A second study by Price and Barrell (1990) subsequently tested this model of hypothesised interrelationships and through path analysis confirmed the statistical validity of the model (see also Price, 1996, 1999). Based on the results of these experiential studies, Rainville and Price (2003) propose 'that hypnosis can be defined as *changes in subjective experience induced by suggestions and characterised by mental ease, absorption, reduction in self-orientation, and automaticity.*' (p. 113).

Recently, Rainville and colleagues (Rainville et al., 2002; Rainville et al., 1999) investigated the changes in brain activity underlying 'mental relaxation' and 'mental absorption', two of the critical experiential dimensions identified by Price and Barrell (1990). In the first of these studies using positron emission tomography (PET), the effects of hypnotic induction on regional cerebral blood flow were described for 8 highly hypnotically suggestible participants (Rainville et al., 1999). PET scans were carried out in a pre-hypnosis baseline condition and a hypnosis condition which followed a standard hypnotic induction procedure taken from the SHSS:A (Weitzenhoffer & Hilgard, 1959). Rainville et al., (1999) reported hypnosis-related bilateral increases in activation in the occipital lobes and in the

inferior frontal gyrus; increases in the left insula; increases on the right in anterior cingulate cortex and anterior superior temporal gyrus; and decreases in right inferior parietal lobule, right medial precuneus, left posterior gingulate gyrus, left medial superior frontal gyrus and left posterior middle temporal gyrus.

In the second of these experiments (Rainville et al., 2002), 10 participants were tested under both baseline and hypnosis conditions, as in Rainville et al., (1999), with a similar induction procedure. Hypnosis-related changes in activation were confirmed by comparing the results of a subtraction analysis (hypnosis minus baseline) with those of Rainville et al., (1999), again showing: increased activations in both occipital lobes, right inferior frontal and superior temporal gyri, left insula and right anterior cingulate cortex regions; and decreased activations in right parietal cortex and left posterior temporal cortex. In an extension of their previous study, Rainville et al., (2002) asked participants to rate their level of mental relaxation and absorption immediately after each scan in both the baseline and hypnosis conditions, allowing them to use regression analyses to examine the brain changes specifically associated with mental relaxation and mental absorption. Feelings of mental relaxation were specifically associated with lower levels of activation in the midbrain, the thalamus and the anterior cingulate cortex, known to be involved in the regulation of vigilance, wakefulness and the brain's arousal level. Similar lower levels of activation in these areas have been shown for slow-wave sleep (Paus, 2000). Consistent with the possibility of a link with general reduction in cortical arousal, relaxation was additionally associated with decreases in activation of somatasensory areas and insula. Rainville and Price (2003) suggest that 'hypnotic relaxation may reflect a state of decreased vigilance and an attenuation of the state of readiness to engage with, or orient toward, external sources of stimulation' (p. 118). In contrast with the effects of relaxation, the brain activations associated with absorption were specifically associated with increases in areas including the upper pons, thalamus, rostral areas of the anterior cingulate cortex, right ventrolateral frontal cortex, right inferior frontal cortex and right inferior parietal lobule. These areas have been shown to be associated with the regulation of attentional processes, error detection and monitoring.

At the moment these two studies (Rainville et al., 2002; Rainville et al., 1999) as well as studies that have investigated the altered and disconnected frontal functions associated with hypnosis (e.g. Gruzelier, 1998, 2004; Egner et al., 2005; see also Chapter 2) offer an indication as to the brain systems that may be involved in the induction of hypnosis, independent of the effects of specific suggested phenomena (e.g. hallucinations, amnesia, analgesia). The results thus far indicate that the induction of hypnosis produces changes in activity within the brain's arousal and attentional systems, and as Rainville et al., (2002) argue such activity is consistent with mechanisms that are involved in the basic aspects of the regulation of consciousness and body-self representation.

5.1.1.2. Summary

The consideration raised so far indicates that multiple factors within the psychosocial context of hypnotic procedures as well the experiences of participants may explain why hypnotic inductions facilitate responsiveness to suggestion. Both mental absorption and mental relaxation have been shown to be key dimensions of the experience of being hypnotised, however, in the authors opinion although relaxation is commonly assumed to be an essential component of hypnosis, there is no good evidence that relaxation is an essential component of the hypnotic state. Studies that have used hypnotic inductions based on increasing mental alertness and physical activity provide evidence to the contrary (e.g. Banyai & Hilgard, 1976; Cardena et al., 1998; see also Chapter 2, section 2.2.2). As outlined above, this chapter aims to investigate the effect of two factors, namely absorption and reduced critical thought on suggestibility and although both these factors were independently hypothesised as potentially instrumental components of hypnotic induction procedures (see Chapter 3, section 3.4) from those of Price's experiential model of hypnosis (Price, 1999), there are common elements that can be identified. The concept of absorption to be investigated in this thesis is identical to the concept offered by Price (1996, 1999). This is not surprising, given that absorption is often cited as an important feature of hypnosis and is widespread within the field (see Chapter 2, section 2.2.3). The concept of reduced

critical thought, although not completely synonymous with any of the dimensions identified by Price, is similar to concepts of 'letting go' as well as 'an absence of judging, monitoring and censoring'. The role of the induction will now be examined in more detail with regard to absorption and reduced critical thought and their relationship with enhanced suggestibility during hypnosis.

5.1.2. Absorption

One of the most commonly reported experiences during the hypnotic situation is absorption or 'openness to absorbing and self-altering experiences' (Tellegen and Atkinson, 1974). In a review of hypnosis, Spanos and Barber (1974) described the concept of absorption as being the most significant point of convergence between many different theories of hypnotic responding. Hilgard (1974) describes the experience of the hypnotised person as one of deep 'immersion in the activity, with indifference to distracting stimuli in the environment' (p. 5). Absorption has most often be operationalised as a personality variable as measured by the Tellegen Absorption Scale (TAS) (Tellegen and Atkinson, 1974), which measures self reported frequency of episodes indicative of absorption during one's everyday life. Tellegen and Atkinson (1974) define absorption as 'a *total* attention, involving a full commitment of available perceptual...imaginative and ideational resources to a unified representation of the attentional object' (p. 168).

Numerous studies have shown that there is a small but reliable correlation between scores on hypnotic suggestibility scales and scores on the TAS (e.g. Nadon et al., 1991; Perlini et al., 1992; Zachariae et al., 2000; for a review of these studies see Chapter 2, section 2.2.3). However, there are a number of studies that have shown that this correlation is dependent on subjects being given the TAS in a context which is related to hypnosis during which hypnotic suggestibility is assessed. If contexts are controlled the correlation is almost always non-significant (see Milling et al., 2000; Chapter 2). Overall, studies in this area indicate at best a low to moderate relationship between absorption and hypnotic responsiveness.

The TAS was designed to measure the frequency of episodes indicative of absorption (Tellegen and Atkinson, 1974), and this may explain why it is not a good predictor of hypnotic responding when administered outside of the hypnotic context. Brown and Oakley (2004) propose a model of cognition in which hypnosis is intrinsically linked to a shift towards a low level, holistic mode of information processing (i.e. non-analytical, intuitive, rapid and dynamic, see Brown & Oakley, 2004, for further explanation), while maintaining focussed attention. If this definition is followed, absorption begins to look more like one of intense and effortless concentration, a process during which one can become involved with an attentional object to various degrees (Brown & Oakley, 2004). Support for this notion has been provided by studies that indicate that highly suggestible participants experience a decrease in the deployment of attention in the peripheral portions of the visual field during hypnosis (e.g. Graham, 1970a; 1970b). Taking this evidence into account, one possible explanation for the patterns of results, is that while frequency of episodes indicative of absorption are not strongly predictive of hypnotic response, the administration of the scale in a hypnotic context provides a possible clue as to the kind of processing required to successfully experience an increase in suggestibility (Braffman and Kirsch, 1999).

5.1.3. Reduced critical thought

A number of researchers have hypothesised that a reduction in critical thought is an integral state associated with the hypnotic situation (Bowers, 1978; Brown, 1999; Deikman, 1966; Fromm 1979, 1992; Gheorghiu, 1989a, 1989b), and as such would increase suggestibility in a hypnotic context. Brown (1999) notes that most hypnotic inductions encourage subjects to adopt an uncritical mode of thinking either implicitly or explicitly. The Harvard Group Scale of Hypnotic Susceptibility (HGSHS, Shor & Orne, 1962), for example, instructs participants not to think about what is occurring and 'just let whatever is happening ... happen by itself' (Shor & Orne, 1962). Many of the responses termed as 'trance logic' (Orne, 1959), where hypnotic subjects appear to tolerate logical inconsistencies without regarding them as strange, seem to also require a temporary suspension of critical thought.

Field (1979) performed a comprehensive linguistic content analysis of hypnotic inductions and contrasted them with parallel analyses of formal and informal speech in non-hypnotic situations. Field found that hypnotic induction wording serves to reduce vigilance and to diminish abstract, logical and critical thought processes.

Fromm's (1979, 1992) ego-psychological framework of hypnosis stresses the notion that the hypnotic individual relinquishes critical thought. Fromm offers the concept of 'ego receptivity' as being central to hypnosis, where active goal-directed thinking and strict adherence to reality orientation are temporarily given up, and the participant can 'just let go'. When the ego is receptive, defences are supposed to be relaxed, allowing into consciousness the emergence of fluid thoughts, associations and images – phenomena that in the non-hypnotic state are usually below the level of conscious awareness. In hypnosis, ego receptivity is encountered primarily as increased suggestibility (i.e. increased openness to stimuli). Bowers (1978) similarly argues that heightened subconscious processing and receptivity lies behind the experience of effortlessness and lack of critical thought during hypnosis and that it is this extra receptivity to subconscious processing that contributes to enhanced suggestibility.

The concept of a reduction in critical thought also corresponds to the neuropsychophysiological model of hypnosis (Crawford & Gruzelier, 1992; Gruzelier, 1998). According to this model, the suggestible individual shifts from an analytical, sequential type of processing to a more holistic and imaginal mode during hypnosis. The notion that hypnosis subsequently involves a shift from analytical to a holistic style of thinking is based on a number of early psychophysiological studies showing activity shifts from the left to the right hemisphere during hypnosis (e.g. Gur & Gur, 1974; see Chapter 4). Such a shift underpins a reduction in generalised reality testing and increases in dissociative experiences (Shor, 1959), and has been supported by many cognitive and physiological studies (e.g. Crawford & Allen, 1983; Gruzelier, 1998; Gruzelier et al., 1984). This evidence provides support for the notion that relinquishing critical thought allows extra receptivity to

subconscious processing that in turn contributes to enhanced suggestibility in the hypnotic context.

5.1.4. The effects of instructions for absorption and reduced critical thought

Given that both absorption and critical thought are possible factors that may contribute to the process of enhanced suggestibility within the hypnotic context, what influence might instructions for absorption or reduced critical thought have on the degree to which individuals will respond to suggestions during hypnosis? A recent study by Brown, Antonova, Langley and Oakley (2001) addressed this question and found that instructions for absorption and reduced critical thought significantly increased suggestibility in a hypnotic context. They measured suggestibility behaviourally and subjectively in both non-hypnotic and hypnotic contexts. Brown et al. (2001) created three hypnotic induction conditions defined by whether the induction included instructions for absorption, critical thought or just relaxation. These researchers compared the change in suggestibility following the three hypnotic induction conditions and the results indicated that changes in both behavioural and subjective responses to suggestion were significantly greater when instructions for absorption and reduced critical thought were given, compared with relaxation alone.

Although the study provides some evidence that absorption and reduced critical thought increases suggestibility during hypnosis, caution needs to be taken when interpreting these findings. Brown et al. (2001) found that instructions for relaxation alone were insufficient to produce an increase in suggestibility, despite the presence of a hypnotic context and positive expectation. According to previous findings simply labelling the context as 'hypnosis' increases suggestibility (e.g. Barber and Calverley, 1964, 1965), and thus an increase in suggestibility would have been expected in all three conditions, including the relaxation condition. Furthermore, Brown et al.'s (2001) study did not include any measures of levels of absorption or critical thought. Consequently there is no way of determining that

participants' psychological states were changed in the intended way by the addition of instructions for absorption and reduced critical thought. Moreover, it remains unclear whether any such changes – should they have been present – were responsible for the increased suggestibility observed in these conditions.

5.1.4. Study objectives

The current study aimed to replicate and extend that of Brown et al (2001). In particular it corrected the shortcomings of the original by including self-report measures of absorption and critical thought. A similar method to that used by Brown et al (2001) was employed. Participants were initially presented with a suggestibility measure in the absence of any formal instructions or mention of hypnosis. The context was then explicitly defined as hypnosis and participants were presented with the suggestibility measure for a second time following standard relaxation (RX condition), relaxation plus absorption (ABS condition) or relaxation plus reduced critical thought instructions (RCT condition)[12]. Behavioural, subjective, and experienced involuntariness measures of responsiveness to suggestion and self-report ratings of absorption, critical thought and relaxation were obtained. It was hypothesised that suggestibility change would be significantly greater when instructions for absorption or reduced critical thought were given, compared with instructions for relaxation alone. Therefore, it was predicted that that the inclusion of instructions to produce a state of (i) absorption and (ii) reduced critical thought would increase suggestibility, independent of any effect produced by the hypnotic context alone or by relaxation.

[12] In line with the methodology used by Brown et al., (2001), relaxation instructions were included in all induction conditions (i.e. RX, ABS & RCT) to enhance the face validity of each of the inductions as 'hypnotic' and provide a realistic hypnotic context. Relaxation is commonly assumed to be an essential component of hypnosis and although most traditional hypnotic inductions include instructions for physical and mental relaxation, there is no evidence that relaxation is an essential component of hypnotic inductions. Studies that have used hypnotic inductions based on increasing mental alertness and physical activity provide strong evidence to the contrary (e.g. Banyai & Hilgard, 1976; Cardena et al., 1998; also see Chapter 2, section 2.2.2)

5.2. Method

5.2.1. Design

This study is the first of a series of experiments aimed to establish the effects of hypnosis and hypnotic procedures on suggestibility. To do this systematically, both non-hypnotic suggestibility (i.e. suggestibility prior to an induction) and hypnotic suggestibility (i.e. suggestibility following an induction) need to be measured. Hypnotic susceptibility happens to be a measure in which there are very wide individual differences, and even a tendency to bimodality in the distributions that are found (e.g. Hilgard, 1965, 1973). With this in mind, selecting groups for treatment on a random basis requires fairly large groups before significant mean differences will be detected. The testing of large random groups is costly and inconvenient in terms of time, effort and availability of participants. Hilgard (1965; Hilgard & Tart, 1966) identifies two alternatives to the testing of larger random groups. The first is to stratify participants on the basis of their known/measured hypnotic susceptibility and then to assign them randomly to experimental/control groups. However, as Hilgard points out, this method: (1) eliminates the possibility of beginning with naïve participants and (2) allows experienced participants (i.e. participants that have had their susceptibility previously measured) to detect any contrast between non-hypnotic and hypnotic conditions.

The second alternative is to use participants as their own controls, which is the experimental design used for this and subsequent studies (outlined in Chapter 3, section 3.4). This allows the use of naïve participants, which is essential for an accurate comparison between non-hypnotic and hypnotic responsiveness. It also shares the advantage with the random assignment method. When participants do not serve as their own controls in studies of suggestibility with and without induction, no advantage is taken of the very high correlation between non-hypnotic and hypnotic suggestion in determining gains from one condition to the other. The key disadvantages of not stratifying participants on the basis of their

measured susceptibility (i.e. high, medium, low) are: (1) you may get a disproportionate number of high, medium and low hypnotically suggestible individuals in your experimental and control groups; and (2) there is the potential for ceiling effects for the very responsive individuals. However, there is no evidence for either of these in previous studies (Ns ranging between 30-170) that have adopted this design (Barber & Glass, 1962; Braffman & Kirsch, 1999; Hilgard & Tart, 1966; Weitzenhoffer & Sjoberg, 1961)

While there are possible disadvantages, this design is the most economical and instructive method, and has been used by all previous studies that have investigated the effect of hypnotic induction on suggestibility (Barber & Glass, 1962; Braffman & Kirsch, 1999; Hilgard & Tart, 1966; Hull, 1933; Weitzenhoffer & Sjoberg, 1961; See Chapter 3 for a detailed review).

A 3 x 2 (condition x context) between-within design was employed, with induction condition as the three level independent variable (RX vs. ABS vs. RCT). The RX condition served as a control, since it has been shown by previous research that relaxation is not an essential component of hypnotic inductions nor is relaxation necessary or sufficient on its own to produce the increase in suggestibility usually found during hypnosis (Banyai & Hilgard, 1976; Cardena et al., 1998; Cardena & Spiegel, 1991; Fellows, 1986; Fellows & Richardson, 1993). Suggestibility was assessed for all participants in a non-hypnotic context (SA_1: first suggestibility assessment) and in a hypnotic context (SA_2: second suggestibility assessment). Changes in behavioural, subjective and experienced involuntariness suggestibility scores from SA_1 to SA_2 were the principle dependent variables. The self-report ratings of relaxation, absorption and critical thought were the secondary dependent variables, which also served as predictor variables, as they were used to predict changes in suggestibility.

5.2.2. Measures

5.2.2.1 Suggestibility scale

Existing suggestibility scales were unsuitable for the present study due to length, practicality of using the same scale twice, and the lack of both behavioural and subjective measures. Also, most existing scales contained items that were deemed unsuitable for repeated presentation. For these reasons and to ensure comparability, suggestibility was measured using the scale constructed by Brown et al. (2001), which incorporated items from a number of existing suggestibility scales (full scale presented in Appendix 5.1). The scale was used to measure suggestibility before (SA_1) and after (SA_2) the hypnotic induction manipulation. Following the methodology of Brown et al (2001) and the recommendations of Braffman and Kirsch (1999), the order of the so-called 'non-hypnotic' and 'hypnotic' suggestibility assessments was not counterbalanced, with the 'non-hypnotic' condition first, so as to maintain participants' naivety concerning hypnosis during the non-hypnotic assessment. This is important, as there is a tendency, whether deliberate or unconscious, for participants to modify their behaviour under control conditions when they know that a hypnotic session is to follow (Zamansky et al., 1964).

The scale lasted approximately 10 minutes and consisted of eight suggestions in total taken from the Barber Suggestibility Scale (BSS: Barber, 1965), the Carleton University Responsiveness to Suggestion Scale (CURSS: Spanos, Radtke, Hodgins, Stam & Bertrand, 1983), the Stanford Hypnotic Susceptibility Scale, form C (SHSS:C; Weitzenhoffer & Hilgard, 1962) and the Creative Imagination Scale (CIS: Barber & Wilson, 1979). There were three challenge suggestions (BSS: hand lock; CURSS: arm immobility and arm rigidity), three cognitive suggestions (BSS: thirst hallucination; SHSS:C: taste hallucination; CIS: music hallucination), and two ideo-motor suggestions (BSS: arm levitation; CURSS: hand repulsion). Two versions of the scale were created, with the same items in different testing orders, which were counterbalanced and presented across the conditions. However,

the relative order of ideomotor, challenge and cognitive suggestions was always maintained across the two tests.

Behavioural, subjective and experienced involuntariness suggestibility scores were measured for both SA_1 and SA_2 (scoring booklet and criteria presented in Appendix 5.2). Scoring of the suggestibility items was adapted from Brown et al., (2001) and the BSS (Barber, 1965). Behavioural scores were measured in a dichotomous fashion for each suggestion, and participants scored 'one point' if they enacted behaviour consistent with the suggested effect (e.g. hands moving apart during hand repulsion) and 'zero' if they did not. In line with the original BSS version (Barber, 1965) half a point was awarded for the hand lock suggestion, if the participants' hands were still together after 5 seconds and a full point if their hands remained together after 15 seconds. Therefore, total behavioural suggestibility scores ranged from zero to eight.

Subjective scores were taken for all suggestions. Ratings were based on how real the suggestion felt to the participant. Participants were asked to rate on a scale of '1-10', for each suggestion, the extent to which they actually felt the suggestion. Total subjective suggestibility scores ranged from eight to eighty.

Experienced involuntariness scores were taken for each item for which the participant obtained a score on the behavioural assessment (including the half-point on the hand lock item), with the exception of the thirst, taste and music hallucinations for which involuntariness scores were taken irrespective of a behavioural response score. Ratings were made on a 'forced-choice' scale and were based on how involuntary the suggested effect was felt to be by the participant. Participants scored 'one point' for every behavioural response that was perceived as being involuntary and 'zero' if they reported that they complied with the situational expectation and carried out the behaviour on purpose. Total experienced involuntariness suggestibility scores ranged from zero to eight.

5.2.2.2. Absorption and critical thought

Absorption and critical thought were assessed following SA_2 (full questionnaire assessing levels of absorption and critical thought presented in Appendix 5.3). Absorption scores were obtained for each suggestion, by asking participants to rate on a five point Likert scale (1 = *much harder than normal*; 5 = *much easier than normal*), how easy it was to focus their attention on the suggestion. Total absorption scores were calculated by summing the absorption ratings for each suggestion, creating a scale range from eight to forty. A high score indicated that the participant was highly focussed or 'absorbed', whilst a low score suggested that the participant found it difficult to focus their attention on the suggestions.

Critical thought scores were obtained for each suggestion, by asking participants to rate on a four point Likert scale (1 = *always attentive to suggestion; no extraneous thoughts*; 4 = *hardly attended to suggestion at all; mostly extraneous thoughts*), how many thoughts unrelated to the suggestion they had. Total critical thought scores were calculated by summing the critical thought ratings for each suggestion, with a possible range from eight to thirty-two. A high score indicated that the participant thought critically about the suggestions, whereas a low score inferred that the participant had little or no extraneous thoughts and did not critically analyse. Relaxation scores were also obtained by asking participants to rate on a scale of '0-100' (a score of 100 indicating total relaxation) how relaxed they were during SA_1

5.2.3. Hypnotic context and inductions

A hypnotic context was explicitly established by making reference to hypnosis after SA_1, using the following instructions:

> 'In this second part of the study, we want to assess your ability to experience the same suggestions, only this time we will ask you to experience them whilst in *hypnosis.* So in this version, the suggestions will be preceded by a *hypnotic induction* to help you become *hypnotised.*'

This enabled the study to address the question of whether the inclusion of instructions for (a) absorption and (b) reduced critical thought contribute to the suggestibility change observed following a hypnotic induction, over and above that produced by an explicit hypnotic context alone.

Three induction conditions were created each consisting of initial relaxation instructions plus additional instructions for either relaxation, absorption or reduced critical thought depending on which condition the induction was to be used in (instructions for relaxation, absorption and reduced critical thought presented in full in Appendix 5.4). Initial relaxation instructions were adapted from the Carleton University Responsiveness to Suggestion Scale (CURSS: Spanos, Radtke, Hodgins, Stam & Bertrand, 1983) by adding opening and closing statements and removing all references to sleep. When using relaxation procedures it is important to recognise the difference between mental and physical relaxation and their potentially different properties and effects. The relaxation procedure used in this study consisted of instructions for *both* physical and mental relaxation. These instructions served as a standard relaxation procedure (adapted relaxation instructions presented in Appendix 5.5). All induction conditions included instructions for relaxation in order to provide a realistic hypnotic context and to maximise responsiveness to suggestions in all conditions. All instructions were recorded onto standard audio-cassettes to increase experimental control.

5.2.4. Participants

In all 102 participants (37 males & 65 females) took part in this study. All participants were undergraduate university students, with the majority being recruited from University College London. The age of participants ranged from 18-50 years, with a mean age of 22.31 years (SD = 4.10). All participants signed up for an experiment entitled, 'the influence of state and context on behaviour', were randomly allocated on the day of assessment and participated in one of the following three conditions: RX (N=34, 10 male & 24 female); ABS

(N=34, 14 male & 20 female) or RCT (N=34, 13 male & 21 female). Participants were recruited via advertisements placed around university. To avoid selection bias and to maintain participants' naivety concerning hypnosis during SA_1, there was no mention of hypnosis on the advert. Psychology students were excluded from the sample due to familiarity with hypnotic procedures, methodology, and investigators. The joint UCL/UCLH Committee on the Ethics of Human Research approved this study; informed consent was obtained from all participants.

5.2.5. Procedure

Participants were tested individually in a quiet room and were told that the experiment would involve listening to and following instructions on an audio-cassette. They were given an information sheet, which stated that the experiment was designed to measure 'the effects of context and state on thought and behaviour'. Any reference to 'hypnosis' was strictly avoided. The information sheet emphasised that participants were free to withdraw from the study at any point, without having to give a reason. After reading the information sheet and giving consent, participants were presented with SA_1. Participants were informed that it was a measure of imagination. After scoring SA_1, a hypnotic context was explicitly established and participants were informed that the remaining part of the study would be similar in content to the part they had already completed, but their ability to experience the same suggestions would now be measured after receiving a hypnotic induction. At this point, participants were given an explicit opportunity to withdraw from the study. All participants were then given standard progressive relaxation instructions plus additional instructions for either relaxation (RX), absorption (ABS) or reduced critical thought (RCT) depending on which experimental condition they had been assigned to. SA_2 was then presented and behavioural, subjective and experienced measures of responsiveness to suggestion were scored. Finally, participants were asked to rate their levels of absorption and critical thought for each of the eight suggestions during SA_2.

5.2.6. Statistical analyses

SPSS for Windows (version 10.1) was used for the analyses of data. The effect of condition on suggestibility (behavioural, subjective, involuntariness) was tested using a 3 x 2 (condition x context) between-within analyses of covariance (ANCOVA), taking suggestibility scores at SA_1 as the covariate. Comparison of the means were carried out by Fisher's protected least significant difference (LSD) test (Carmer & Swanson, 1973; Howell, 1997). Paired-samples Student's t-tests were carried out to compare suggestibility scores for the first suggestibility assessment (SA_1) with suggestibility scores for the second suggestibility assessment (SA_2). A rejection region with at least a value of $p < 0.05$ was selected and used throughout (Tabachnick and Fidell, 2001)

5.3. Results

Means and standard deviations of responses to suggestion in non-hypnotic (SA_1) and hypnotic (SA_2) contexts for each condition are presented in Table 5.1 and Figure 5.1. As an important part of the analyses, quantification of the effect of condition on responsiveness to suggestion was calculated (see Table 5.1). The data were screened for univariate and multivariate outliers. No cases were found to have standardised scores in excess of ± 3.29 ($p< 0.001$, two-tailed test). The data were normally distributed, with no skewness and kurtosis values exceeding standardised scores of ± 3.29 ($p< 0.001$, two-tailed test). Mahalanobis distances (critical values, $\chi^2_{(6)} = 22.458$, $p <0.001$) were calculated. No cases were found to have Mahalanobis distances greater that the critical value demonstrating the absence of multivariate outliers.

Correlations between non-hypnotic suggestibility (SA_1) and hypnotic suggestibility (SA_2) were significant for all measures, in each condition: behavioural (RX: $r = 0.762$, $p < 0.001$; ABS: $r = 0.599$, $p < 0.001$; RCT: $r = 0.545$, $p < 0.001$); subjective (RX: $r = 0.608$, $p < 0.001$; ABS: $r = 0.655$, $p < 0.001$; RCT: $r = 0.403$, $p < 0.025$); experienced involuntariness (RX: $r = 0.878$, $p < 0.001$; ABS: $r = 0.596$, $p < 0.001$; RCT: $r = 0.624$, $p < 0.001$). Concerning

behavioural responses, 15 participants (44%) in the RX condition passed fewer suggestions following instructions for relaxation only, 8 (24%) showed no change at all, and 11 (32%) exhibited greater suggestibility. Nine participants (26%) in the ABS condition showed a decrease in behavioural scores, with 4 participants (12%) showing no change, and 21 (62%) showing a greater behavioural response following instructions for absorption. Six participants (18%) in the RCT condition reported reduced behavioural responses, whilst 7 (20%) reported no change, and 21 (62%) reported greater behavioural responses following instructions for reduced critical thought. The frequency distributions of changes in behavioural, subjective and involuntariness measures of responsiveness to suggestion for each condition are displayed in Table 5.2.

5.3.1. Effect of condition on suggestibility

The ANCOVA for behavioural scores indicated a significant main effect for Condition [$F_{(2,98)} = 4.728$, $p < 0.025$]. This effect revealed that change in behavioural suggestibility scores was significantly different between: (i) the ABS and RX conditions [LSD test, $p < 0.01$]; and (ii) the RCT and RX conditions [LSD test, $p < 0.025$]. The difference between the ABS and RCT conditions on change in behavioural suggestibility scores was non-significant. There were no significant differences in behavioural scores at SA_1. Paired samples t-tests indicated that behavioural scores increased from SA_1 to SA_2, for both the ABS [$t_{(33)} = 3.209$, $p < 0.01$] and RCT [$t_{(33)} = 3.476$, $p < 0.001$] conditions. No significant difference in behavioural scores from SA_1 to SA_2, was found for the RX condition.

Table 5.1. Mean (standard deviation) responses to suggestion for the relaxation (RX), absorption (ABS) and reduced critical thought (RCT) conditions, in both non-hypnotic (SA_1) and hypnotic (SA_2) contexts.

	Behavioural			Subjective			Involuntariness		
	SA_1	SA_2	Effect Size (*d*)	SA_1	SA_2	Effect Size (*d*)	SA_1	SA_2	Effect Size (*d*)
RX	2.97 (1.90)	2.93 (2.20)	-0.02	27.27 (10.05)	26.91 (9.64)	-0.04	2.06 (1.52)	1.91 (1.94)	-0.09
ABS	3.06 (1.65)	4.13 (2.42)	0.52	26.24 (11.51)	36.84 (11.77)	0.92	2.12 (1.45)	3.56 (1.79)	0.90
RCT	2.92 (1.56)	3.88 (1.82)	0.57	24.88 (8.67)	30.44 (9.46)	0.62	2.09 (1.26)	3.06 (1.59)	0.69

Note.

Behavioural scores are ratings of behavioural responses to suggestions & are defined as the number of suggestions passed out of eight. *Subjective scores* are ratings of degree to which participants felt the subjective effects called in each suggestion & were rated out of eighty (i.e. measured on a scale of 1-10 for each of the eight suggestions). *Involuntariness scores* are ratings of experienced involuntariness of suggestions & defined as the number of suggestions experienced as being involuntary out of eight

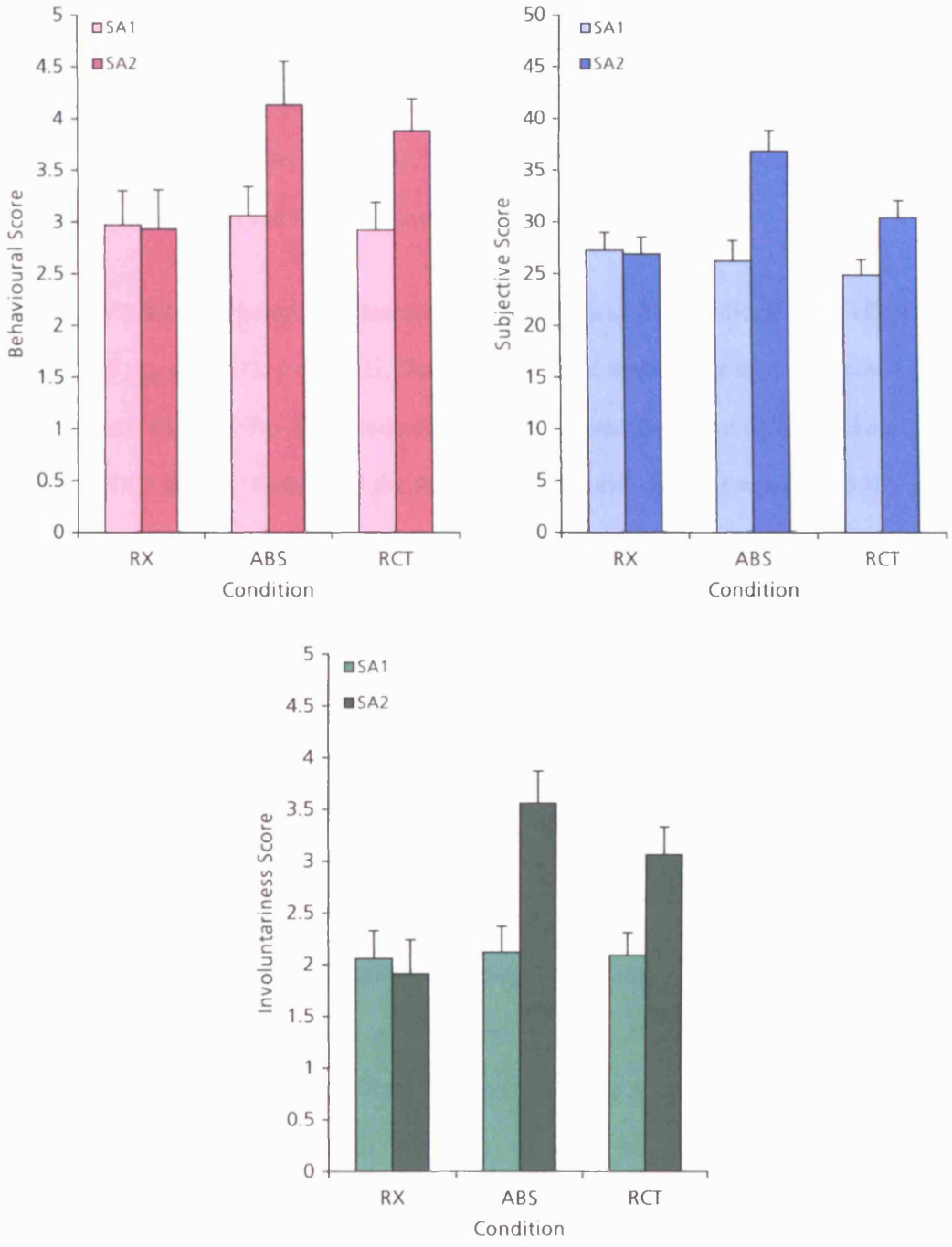
Table 5.2. Frequency distribution (percentages) of changes in behavioural, subjective and experienced involuntariness measures of suggestibility as a function of instructions for relaxation (RX), absorption (ABS) and reduced critical thought (RCT)

	Behavioural			Subjective			Involuntariness		
	Decrease	Same	Increase	Decrease	Same	Increase	Decrease	Same	Increase
RX	15 (44%)	8 (24%)	11 (32%)	18 (53%)	0 (0%)	16 (47%)	15 (44%)	8 (24%)	11 (32%)
ABS	9 (26%)	4 (12%)	21 (62%)	4 (12%)	0 (0%)	30 (88%)	2 (6%)	7 (20%)	25 (74%)
RCT	6 (18%)	7 (20%)	21 (62%)	6 (18%)	2 (6%)	26 (76%)	3 (9%)	10 (29%)	21 (62%)

Note.

A *decrease* was when participants' responses to suggestion were lower at SA_2 (after an induction) when compared to their responses at SA_1 (prior to an induction). *Same* refers to when participants responses to suggestions were the same at both SA_1 and SA_2. An *increase* was when participants' responses to suggestion were higher at SA_2 when compared to their responses at SA_1

Figure 5.1. Mean (standard error) behavioural, subjective and involuntariness suggestibility scores for the relaxation (RX), absorption (ABS) and reduced critical thought (RCT) conditions



As with behavioural scores, the ANCOVA for subjective scores indicated a significant main effect for Condition [$F_{(2,98)} = 10.688$, $p < 0.001$]. This effect revealed that change in subjective suggestibility scores was significantly different between: (i) the ABS and RX conditions [LSD test, $p < 0.001$]; and (ii) the RCT and RX conditions [LSD test, $p < 0.01$].

The difference between the ABS and RCT conditions on change in subjective suggestibility scores was non-significant. There were no significant differences in subjective scores at SA_1. Paired-samples t-test indicated, again as with behavioural scores, revealed a significant increase in subjective scores from SA_1 to SA_2, for both the ABS [$t_{(33)} = 5.910$, $p < 0.001$], and RCT conditions [$t_{(33)} = 4.106$, $p < 0.001$]. No significant difference in subjective scores from SA_1 to SA_2, was found for the RX condition.

The ANCOVA for experienced involuntariness scores indicated a significant main effect for Condition [$F_{(2,98)} = 16.971$, $p < 0.001$]. This effect revealed that change in experienced involuntariness suggestibility scores was significantly different between: (i) the ABS and RX conditions [LSD test, $p < 0.001$]; (ii) the RCT and RX conditions [LSD test, $p < 0.001$]; and (iii) the ABS and RCT conditions [LSD test, $p < 0.01$]. There were no significant differences in experienced involuntariness scores at SA_1. Paired samples t-tests indicated a significant increase in experienced involuntariness from SA_1 to SA_2, for both the ABS [$t_{(33)} = 6.112$, $p < 0.001$] and RCT [$t_{(33)} = 3.569$, $p < 0.001$] conditions. No significant difference in experience involuntariness scores from SA_1 to SA_2, was found for the RX condition.

5.3.2. Absorption, critical thought and relaxation

Means and standard deviations of self-report ratings for relaxation (a score reflecting change in relaxation between non-hypnotic and hypnotic contexts), absorption, and critical thought are presented in Table 5.3. The former rating was measured in relation to both non-hypnotic (SA_1) and hypnotic contexts (SA_2), whilst the latter two ratings were measured in to relation to the hypnotic context only (SA_2). A significant positive correlation was found between self-reported absorption and relaxation, for both the ABS ($r = 0.470$, $p < 0.01$) and RCT conditions ($r = 0.363$, $p < 0.05$). No relationship was found between self-reported absorption and relaxation for the RX condition. A significant negative correlation between self-reported absorption and critical thought was found for all conditions (RX: $r = -0.420$, $p < 0.05$; ABS: $r = -0.768$, $p < 0.01$; RCT: $r = -0.553$, $p < 0.01$). No significant

relationship was found between self-reported relaxation and critical thought for any of the conditions. Correlations between self-report ratings, SA_1 scores and SA_2 scores are presented in Table 5.4.

Hierarchical multiple regression analyses were preformed to measure whether scores of absorption, critical thought and relaxation predicted changes in behavioural, subjective and experienced involuntariness measures of hypnotic suggestibility (SA_2). Hypnotic suggestibility scores (SA_2) were entered as the dependent variable. Non-hypnotic suggestibility scores (SA_1) and induction condition were used as covariates and entered in block 1. Absorption, critical thought and relaxation scores were entered in block 2 in a stepwise fashion. Stepwise regression was used, as the IVs used in these analyses could not be assigned theoretical importance with regard suggestibility.

Non-hypnotic suggestibility, induction condition and absorption all predicted behavioural responses to suggestion, with variance associated with the other variables controlled (non-hypnotic suggestibility: $\beta = 0.574$, $p < 0.001$; condition: $\beta = 0.160$, $p < 0.05$; absorption: $\beta = 0.294$, $p < 0.001$). Together these variables accounted for 51.1% of the variance in hypnotic behaviour, with absorption scores uniquely accounting for 8.3% of the variance in hypnotic behaviour. Neither relaxation scores nor critical thought ratings predicted change in behavioural suggestibility.

A similar pattern of results was found for subjective responses to suggestions, with non-hypnotic suggestibility, induction condition and absorption all predicting subjective responses to suggestion, when variance associated with the other variables is controlled (non-hypnotic suggestibility: $\beta = 0.580$, $p < 0.001$; condition: $\beta = 0.154$, $p < 0.25$; absorption: $\beta = 0.374$, $p < 0.001$). Together these variables accounted for 56.4% of the variance in hypnotic behaviour, with absorption scores uniquely accounting for 13.4% of the variance in hypnotic behaviour. Again, neither relaxation scores nor critical thought ratings predicted change in subjective suggestibility.

Table 5.3. Mean (standard deviation) ratings for relaxation, absorption and critical thought

Rating	Condition		
	RX	ABS	RCT
Relaxation	7.85 (11.44)	14.24 (12.07)	11.12 (11.91)
Absorption	21.20 (9.10)	27.50 (8.80)	27.00 (7.40)
Critical Thought	14.40 (8.30)	15.50 (9.10)	14.60 (8.80)

Note.

Relaxation ratings were rated out of 100, with the scores in the table reflecting change in relaxation between SA_1 and SA_2. *Absorption ratings* were rated out of 40 (measured on a scale of 1-5 for each of the eight suggestions). *Critical thought ratings* were rated out of 32 (measured on a scale of 1-4 for each of the eight suggestions)

Table 5.4. Correlations between self-report ratings, suggestibility scores in a non-hypnotic context (SA_1), and suggestibility scores in a hypnotic context (SA_2)

Condition & Self-report Ratings	Behavioural		Subjective		Involuntariness	
	SA_1	SA_2	SA_1	SA_2	SA_1	SA_2
RX						
Relaxation	0.14	0.02	0.18	0.17	-0.09	-0.14
Absorption	0.38*	0.47**	0.20	0.45**	0.30	0.34*
Critical Thought	-0.19	-0.18	-0.18	-0.32	-0.01	-0.12
ABS						
Relaxation	0.21	0.21	0.06	0.31	0.07	0.12
Absorption	0.31	0.48**	0.24	0.62**	0.16	0.57**
Critical Thought	-0.16	-0.30	-0.13	-0.49**	-0.74	-0.54**
RCT						
Relaxation	0.23	0.13	0.18	0.28	0.11	0.12
Absorption	0.27	0.46**	0.16	0.60**	0.27	0.54**
Critical Thought	-0.17	-0.20	-0.17	-0.31	-0.17	-0.29

Note.

*$p < 0.05$; **$p < 0.01$

Four variables were found to predict experienced involuntariness suggestibility scores, when variance of the other variables was controlled (non-hypnotic suggestibility: $\beta = 0.473$, $p < 0.001$; condition: $\beta = 0.195$, $p < 0.01$; absorption: $\beta = 0.4245$, $p < 0.001$; relaxation: $\beta = 0.172$, $p < 0.025$). Together these variables accounted for 59.5% of the variance in hypnotic behaviour, with absorption scores uniquely accounting for 22.1% and relaxation uniquely accounting for 2.7% of the variance in hypnotic behaviour. Critical thought ratings did not predict change in experienced involuntariness scores of suggestibility.

5.3.3. Manipulation check

Independent groups analysis of variance (ANOVA) was used to analyse whether there was an effect of induction on the self-report ratings of absorption, critical thought and relaxation. This was in essence 'manipulation check' to analyse whether the induction used, actually produced the effects (i.e. absorption and reduction in critical thought) that they were designed for. ANOVAs revealed no significant effects for Condition on self-reported absorption, critical thought or relaxation ($ps > 0.1$)

5.4. Discussion

Presenting suggestions in a hypnotic context increases suggestibility for many individuals. This study set out to investigate whether absorption and a reduction in critical thought are possible factors that may contribute to the process of enhanced suggestibility within the hypnotic context. In line with expectation, behavioural, subjective and involuntariness measures of responsiveness to suggestion increased significantly (from SA_1 to SA_2) following the inclusion of instructions for absorption and reduced critical thought. The mean effect sizes of adding either instructions for absorption or reduced critical thought to a hypnotic induction on suggestibility were substantial, varying from 0.52 to 0.92 (see also Chapter 3). Neither behavioural, subjective nor involuntariness measures of responsiveness to suggestion changed significantly following instructions for relaxation only. Moreover, the results indicate that the changes in behavioural, subjective and involuntariness measures of

suggestibility were significantly higher in both the ABS and RCT conditions compared to the RX condition. These findings provide support for those previously reported by Brown et al., (2001) and indicate that instructions for absorption and reduced critical thought facilitate suggested responding, over and above that produced by the hypnotic context alone.

The current study addressed the shortcomings of the original Brown et al., (2001) study, by including self-report measures of absorption, critical thought and relaxation which were used to get a more comprehensive idea of what was associated with the changes in suggestibility. The results indicate that self-reported absorption was associated with the changes in suggestibility. Absorption ratings were found to significantly predict behavioural, subjective and involuntariness measures of hypnotic suggestibility, accounting for 8.3% - 22.1% of the variance in hypnotic behaviour. Relaxation scores were also found to predict the subjective measure of hypnotic suggestibility. However, self-reported critical thought ratings were found not to be predictive of any measures of hypnotic suggestibility. The finding that reduced critical thought was not predictive of hypnotic suggestibility could be due to the instructions used to produce a reduction in critical thought. Wegner, Schneider, Carter and White (1987) in an experiment on thought suppression, found that when participants were asked not to think of a white bear (i.e. attempting to suppress a thought), participants became more pre-occupied by it and reported an increase in thought of the bear. Similarly, the instructions used to produce a reduction in critical though in the currently study, instructed participants to 'avoid thinking critically', and not to 'question' or 'analyse' which may have produced an effect similar to the ones found in the suppression experiments (e.g. Wegner et al., 1987; Wenzlaff, Wegner & Klein, 1991).

5.4.1. The hypnotic context and suggestibility

Overall, 6-26% of participants in the ABS and RCT conditions reported a decrease in responses to suggestion following either instructions for absorption or reduced critical

thought in a hypnotic context; with 6-29% reporting no change; and 62-74% of participants in these conditions exhibited greater responses to suggestions. These findings are in line with previous research (e.g. Barber & Glass, 1962; Hilgard & Tart, 1965; Weitzenhoffer & Sjoberg, 1961; see also Chapter 3). However, as in the Brown et al. (2001) study, it was found that instructions for relaxation alone (RX condition) were insufficient to produce a significant mean increase in suggestibility, despite the presence of an explicit hypnotic context. Indeed, for the behavioural and experienced involuntariness measures of suggestibility, the majority of participants in the RX condition (approximately 70%) experienced a decrease or no change in suggestibility. This finding is contrary to previous research, as simply labelling the situation as 'hypnosis' should significantly increase suggestibility (Barber & Calverley, 1965; Starr & Tobin, 1970). There is even strong evidence that virtually anything described as hypnosis, tends to produce 'hypnotic' effects (e.g. Banyai & Hilgard, 1976; Barber, 1977; Kroger & Schneider, 1959). The current finding goes against this very powerful effect (i.e. expectation) and it must be emphasised how unexpected a finding this is.

5.4.2. The role of state changes in determining increases in suggestibility

The central question of interest concerning the findings is: why do instructions for absorption and reduced critical thought increase suggestibility? One possibility is that instructions for absorption and reduced critical thought may have brought about state changes that account for these results. Brown & Oakley's (2004) cognitive model of suggestibility provides a theoretical framework that may explain how states of absorption and reduced critical thought increase suggestibility. Based on Norman and Shallice's (1986) model of attentional control of action, Brown & Oakley propose that routine and automatic behaviour is governed largely by 'low level' attentional systems, which serve to select from memory, behavioural and perceptual representations that fit the stimulus environment. These representations are then passed on to higher-level attentional systems for conscious processing. High level perceptual processing occurs when retrieval of representations from

memory is insufficient and is based on general problem solving algorithms (Logan, 1988). Thus, what a person experiences, is an inference based on the best fitting perceptual hypothesis available to them. According to the theory, response to a suggestion depends on the automatic selection of perceptual or behavioural representation corresponding to the suggestion, from a range of possible representations of the environment. Instructions for absorption and reduced critical thought may cause a decrease in the amount of high level processing occurring within an individual, as well as increasing the salience of the suggestion within the stimulus environment. Thereby, biasing selection of perceptual and behavioural representations corresponding to the suggested effect, and increasing suggestibility.

5.4.3. Have state changes occurred?

The findings of the present investigation suggest that an altered psychological state characterised by being 'absorbed' or a 'reduction in critical thought' plays a role in increasing suggestibility typically observed during hypnosis. These findings appear to imply that socially orientated research and so-called 'non-state' factors, such as expectation and motivation, although crucial to the understanding of hypnotic suggestibility, cannot represent a full explanation, and therefore must be complemented by the understanding of state changes associated with hypnosis. However, for this interpretation to have any validity, there needs to be evidence that the instructions for absorption and reduced critical thought actually did bring about the state changes that they were designed for. The self-reported measures indicated that there were no differences with regard to levels of absorption, critical thought, or relaxation, in participants, between the three experimental conditions. This data provides ambiguous results and suggests that instructions for absorption and reduced critical thought did not increase suggestibility by bringing about state changes or at least not in the way intended.

A possible reason for the homogeneity of absorption and critical thought ratings across the conditions may lie in the original formulations of the concepts. Absorption and reduced critical thought may be viewed as working synergistically during hypnosis and it is conceivable that they reflect different aspects of the same cognitive processes (Tellegen & Atkinson, 1974; Brown, 1999). It is possible that instructions to become relaxed may also 'tap' these mechanisms. This suggests that relaxation, absorption and reduced critical thought may be inextricably linked. Instructions to increase absorption may also lead to less critical thought and increased relaxation; similarly, instructions for a reduction in a critical thought may in turn increase absorption and relaxation levels. However, this interpretation that there may have been similar levels of absorption and reduced critical thought across the conditions, cannot account for the differences in suggestibility between the conditions.

An alternative explanation is that levels of absorption and critical thought did differ across conditions and it was the choice of scales used in this study that were not sensitive enough to detect these differences. Bowers, Laurence and Hart (1988) point out the inadequacies of some forced-choice scales in which options that are available to subjects do not cover the range of possible responses. Participants, perceiving that they are obliged to use one of the options that are available to them (despite their failing to accurately reflect what has been experienced) may use the scales in idiosyncratic ways that are misleading. Measures in the 'either-or' format have to be treated with some caution because they may mask important differences in individual responses and 'states' and can conceal relevant data and distort judgements. Another potentially key limitation of the scales used in this study relates to the measurement of critical thought. Critical thought was measured by asking participants to rate on a four point Likert scale (1= *always attentive to suggestion; no extraneous thoughts;* 4= *hardly attended to suggestion at all; most extraneous thoughts*), how many thoughts unrelated to the suggestion they had. However, on examination of the wording and descriptors used (also see Appendix 5.3) the scale seems to address intrusive and extraneous thoughts rather than critical and analytical thoughts per se, and consequently critical thought may not have been measured in the way intended. In addition, the use of wording such as 'attentive' and

'attended' may of resulted in the critical thought scale measuring some form of focussed attention or a concept closely related to absorption, which could have also contributed to the uniformity of absorption and critical thought ratings found. Based on these considerations, it is essential that the future measurement of critical thought explicitly refers to 'critical thought' and *only* critical thought, with scales using descriptors and wording such as 'critical' and 'analytical' instead of 'extraneous' and 'distracting'.

The current study also did not include measures of absorption and critical thought in a non-hypnotic context. Consequently, change in levels of absorption and critical thought could not be calculated. This is of great importance, as absorption and a reduction in critical thought are not necessarily unique to the hypnotic context, and by measuring them in a non-hypnotic context in addition to in a hypnotic context, variability in non-hypnotic levels of absorption and critical thought can be controlled for. This will allow a more systematic examination of the effect of absorption and a reduction in critical thought on suggestibility.

Future studies should consider using visual analogue scales with appropriate descriptors in both non-hypnotic as well as hypnotic contexts. In addition, overall ratings for absorption and critical thought for the suggestibility scale as a whole may be preferred, over ratings of absorption and critical thought for each suggestion, as the latter is heavily dependent on very accurate long-term memory. With this in mind, instructions for absorption and reduced critical thought may have increased suggestibility because they brought about state changes. However, more sensitive techniques such as visual analogue scales (e.g. Price, McGrath, Rafii, & Buckingham, 1983) and those used by Bowers (1982) to measure effortless experiences, may seem necessary to assess the subtle variations in responses when measuring absorption and critical thought.

Although it is clear that more sensitive techniques are needed to measure levels of absorption and critical thought, the fact remains that absorption was the only significant predictor of suggestibility change, with it predicting behavioural, subjective and experienced

involuntariness measures of hypnotic suggestibility, regardless of condition. This remains an interesting finding but one that is not easy to explain in the context of the present study.

5.4.4. The use of strategies

A possible explanation for why absorption significantly predicted suggestibility change, regardless of condition may be related to the use of strategies. The common aspects of the hypnotic inductions in each of the three conditions (i.e. excluding instructions for absorption/reduced critical thought/further relaxation) may have helped identify strategies that facilitate suggestions. This explanation acknowledges that hypnotic participants are not passive responders. They actively cognise so as to fit their responses to the suggestions, and use problem-solving approaches to accomplish this goal. As a result of using strategies to fit their responses to suggestions, participants may have used strategies that were characterised by 'focussing their attention' or being 'absorbed'.

The use of strategies may also offer an explanation, unrelated to state changes, to why instructions for absorption and reduced critical thought increased suggestibility. The inclusion of instructions for absorption and reduced critical thought may have made it considerably easier to identify strategies to facilitate suggestion, or perhaps aided participants to identify a range of strategies. For, example 'concentrative' strategies (Sheehan & McConkey, 1982), characterised by participants concentrating on the suggestions and imaging a literal interpretation of the suggestions; or 'independent' strategies characterised by participants interpreting the suggestion in a manner that is meaningful to them, could have both been identified by instructions for absorption and reduced critical thought. Strategy selection and hypnotic performance is dealt with more comprehensively in Chapter 8.

5.4.5. The effects of expectation

Supportive of a social-cognitive viewpoint is the explanation that instructions for absorption and reduced critical thought may have increased suggestibility as the hypnotic inductions including these instructions may have been more consistent with the lay view of what constitutes an appropriate hypnotic induction. It may have been that the role of instructions for absorption and reduced critical thought may have enhanced the credibility of the definition of the situation as hypnotic, and thus increased expectation and consequently suggestibility (e.g. Barber, 1969; Barber & Calverley, 1964, 1965; Sarbin & Coe, 1972). It is highly likely that participants possessed varied beliefs and attitudes about hypnosis, based on experiences of friends and family, and/or the watching of films and television shows involving its use. Due to this culturally transmitted information about hypnosis, participants may expect hypnosis to occur if some special procedure is used and instructions for absorption and reduced critical thought may be particularly consistent with the lay view of hypnotic inductions. Future studies should incorporate a measure of 'typicality' to assess how 'authentic' the hypnotic inductions were perceived to be.

5.4.6. Conclusions

This study provides evidence that instructions for absorption and reduced critical thought increase suggestibility, over and above that produced by the hypnotic context alone. Therefore, the present findings are consistent with those previously reported by Brown et al (2001). The results may be interpreted as supporting the idea that states of absorption and reduced critical thought facilitate suggested responding. However, the self-report measures used did not provide strong evidence that participants' levels of absorption and critical thought were affected by the instructions for absorption and reduced critical thought. Consideration of the possibility that the increased suggestibility may be unrelated to state changes was also taken. Instructions for absorption and reduced critical thought may have increased suggestibility because (i) they identified strategies that facilitate suggestion or (ii)

they are more consistent with the lay view of what constitutes an appropriate hypnotic induction. Absorption was also found to predict behavioural, subjective, and experienced involuntariness measures of hypnotic suggestibility regardless of condition, which could possibly be explained by the use of strategies

Changes in suggestibility in relation to absorption and critical thought have been measured here using suggestions from standardised hypnotic scales. There are other types of suggested effects within the 'domain of hypnosis' (Hilgard, 1973) that are not reflected in these scales but play an important part in applied clinical and medical settings. One of the aims of the thesis is to discover relationships between induction procedures and suggestibility that are of clinical relevance and can increase the efficacy of hypnosis as a clinical and experimental tool. The use of suggestion in the management of pain is a good example of a practical use of hypnosis that is not reflected in the test items used in the standardised scales. It is worth noting that the use of hypnosis in pain management is one of the few clinical areas where a strong relationship has been demonstrated between hypnotic suggestibility (as measured by these scales) and outcome (e.g. Freeman, Barabasz, Barabasz, & Warner, 2000; Hilgard, 1969; Hilgard & Hilgard, 1983; Hilgard & Morgan, 1975; Miller, Barabasz & Barabasz, 1991; Montgomery, DuHamel & Redd, 2000). However, most of the samples used in these studies consist of almost only high and low hypnotically suggestible individuals, with medium hypnotically suggestible individuals being either excluded entirely or under-represented (Kirsch & Lynn, 1995). This selection process ignores the individuals that make up the majority of the clinical population and may provide an inaccurate and inflated estimate of the relationship between hypnotic suggestibility and hypnotic pain reduction (Kirsch, 1999). The next study continues the work reported in this chapter but uses responsiveness to suggestion for pain modulation to measure changes in suggestibility resulting from an induction procedure. The association between pain modulation and hypnotic suggestibility will also be examined using a representative sample of high, medium and low hypnotically suggestible participants.

Chapter 6

Study 3: Effects of Absorption and Reduced Critical Thought on Responses to Suggestion for Pain Modulation

Chapter overview

The study to be reported here explores further the effects of absorption and reduced critical thought on responsiveness to suggestion using modulation of pain experience as the dependent variable rather than test items from standardised hypnotic suggestibility scales. Pain is widely recognised as a multi-dimensional experience. Pain is personal and subjective, is affected by mood and psychosocial factors and demonstrates tremendous individual variation. The pain reducing effect of hypnotically suggested analgesia is arguably the most useful of all hypnotic phenomena. In addition, the use of hypnosis in pain management is one of the few clinical areas where a strong relationship has been demonstrated between hypnotic suggestibility and outcome (e.g. Hilgard & Hilgard, 1983; Montgomery et al., 2000). However, most of the samples used in these studies consist of almost only high and low hypnotically suggestible individuals, with medium hypnotically suggestible individuals, who make up the majority of the clinical population, being excluded or under-represented. This chapter, therefore, will also examine the association between pain modulation and hypnotic suggestibility using a representative sample of high, medium and low hypnotically suggestible participants. This has important implications for treating and managing pain by psychological approaches and may encourage the application of 'hypnotically' suggested pain modulation to a wider range of people.

6.1. Introduction

One of the most widely held beliefs about hypnosis is that it is particularly effective in the relief and abolition of pain. Hypnosis has played some part in pain reduction and management for over a century in modern medical practice. Numerous studies have demonstrated the efficacy of hypnosis in reducing analogue pain in the laboratory setting (e.g. Hilgard & Hilgard, 1983) and clinical pain problems, including acute and chronic pain (e.g. Barber, 1977, 1996; Hawkins, 2001; Patterson & Jensen, 2003). In a recent meta-analysis of the effects of hypnosis on pain, Montgomery, DuHamel and Redd (2000) classified hypnosis as a 'well established treatment'. They included 18 studies and calculated 27 effect sizes in their meta-analysis, and overall their findings indicated a moderate to large effect size of 0.74[13]. They found that for 75% of the sample population hypnosis provided substantial pain control in both laboratory and clinical settings[14], and concluded that hypnotic suggestion is an effective analgesic from which the majority of the population (with the exception of low hypnotic suggestibles) should obtain 'at least some' benefit. In addition, they found the effect size of hypnotic analgesia was mediated by hypnotic suggestibility, with individuals that were highly suggestible tending to demonstrate larger responses to hypnotic suggestions for analgesia compared to low suggestible individuals.

The remainder of this chapter will focus primarily on the effects of hypnosis on induced pain in the laboratory setting, including theoretical explanations and physiological correlates of hypnotic pain control. For a comprehensive review of hypnosis and clinical pain, see Patterson and Jensen (2003).

6.1.2. Two theoretical approaches towards hypnotic pain control

Although it is well established that hypnosis can reduce both acute and chronic pain in adults and children, the mechanisms of hypnotic analgesia are still poorly understood (e.g.

[13] Cohen (1992) describes effect sizes of: 0.20 as small; 0.50 as medium; and 0.80 as large

[14] There was no difference in effectiveness between clinical patients and healthy participants

Barber, 1996; Hilgard & Hilgard, 1983; Price, 1996, 1999). These mechanisms may involve cognitive factors such as expectancy, motivation and memory, as well as subtle changes in consciousness and unconscious mechanisms. Much of the research on induced pain in the laboratory setting is organised around two major theoretical paradigms (Patterson & Jensen, 2003; Spanos, 1989), which have been previously identified as the 'generic altered state' conception of hypnosis and the 'generic non-state' view (Kirsch, 2004; also see Chapter 2 for a fuller account of contemporary theories).

The 'generic altered state' approach maintains that hypnosis is a special state of psychological functioning characterised by unique cognitive, behavioural, phenomenological and physiological processes. In contrast, the 'generic non-state' perspective, explains hypnotic analgesia by psychological factors including contextual cues, demand characteristics, expectancies and role enactment (Kirsch & Lynn, 1995; Spanos, 1986). This perspective rejects the notion that a hypnotic induction or the existence of an altered state of consciousness is necessary for hypnotic responding.

From both perspectives, a plethora of laboratory pain studies have demonstrated an association between analgesia and hypnotic suggestibility (e.g. Greene & Reyher, 1972; for reviews see Hilgard & Hilgard, 1983; Spanos, 1989). Studies have confirmed that both reduction in cold pressor pain (e.g. Freeman, Barabasz, Barabasz & Warner, 2000; Hilgard, 1969; Hilgard & Hilgard, 1983; Hilgard, Morgan & Macdonald, 1975) and ischemic muscle pain (Hilgard & Morgan, 1975; Knox, Morgan & Hilgard, 1974) are related to suggestibility as measured by standardised hypnotic suggestibility scales. These findings are consistent with the effects reported by Montgomery et al., (2000) who found that the effect size of hypnotic analgesia was mediated by hypnotic suggestibility. In other words high suggestibles tend to demonstrate larger responses to hypnotic suggestions for analgesia compared to low suggestibles. Laboratory studies have also found experimental hypnotic analgesia to be associated with expectations (e.g. Chaves & Barber, 1974; Neufeld & Thomas, 1977; Spanos, Hodgins, Stam & Gwynn, 1984), cognitive strategies (Miller & Bowers, 1986; Spanos, Perlini

& Robertson, 1989); compliance (Spanos, Perlini, Patrick, Bell & Gwynn, 1990); and instructional sets (Spanos & Katsanis, 1989).

More recently, a number of researchers (e.g. Gruzelier, 2000; Kihlstrom, 1997; Kirsch & Lynn, 1995) have called for integration between theoretical perspectives, as explaining the effects of hypnosis solely in terms of one theory, as Kihlstrom (1998) puts it 'dooms oneself to an incomplete understanding of a phenomenon' (p. 189). Most researchers would agree that different theorists are looking at diverse aspects, including social, cognitive, phenomenological and physiological aspects of the same phenomenon. Consequently, findings from studies driven by these two 'contrasting' perspectives have helped to identify the factors and possible mechanisms that effect and contribute to hypnotic analgesia. Laboratory studies supporting the 'generic state' approach to hypnosis, indicate that high hypnotic suggestibles are more likely to respond to suggestions for analgesia. The findings from studies within the 'generic non-state' framework emphasise the importance of patients' attitudes, expectations and beliefs, as well as contextual and cognitive factors as being critical in the modulation of the experience of pain (Chaves, 1999). Taken together, one has the beginnings of a comprehensive framework for understanding and investigating hypnotic analgesia.

6.1.3. Physiological correlates of laboratory hypnotic pain control

Many researchers have sought for the 'holy grail' of specific physiological indicators of the 'special' state of hypnosis. There is a voluminous literature regarding the physiological correlates of the hypnotic 'state'. Nevertheless as has been discussed in detail in Chapter 2 there is no evidence, as of yet, of a 'discrete state' or 'discrete states' of hypnosis involving unique patterns of psychological and physiological structures. In fact, most 'hypnotic' phenomena can be produced by suggestion, without the induction of hypnosis (e.g. Barber, 1969). Although much of the research that has attempted to investigate the hypnotic state has yielded meagre results, research on the phenomenon of suggested hypnotic analgesia has

been more fruitful, raising important hypotheses and identifying consistent physiological correlates (Patterson & Jensen, 2003; Price, 1996, 1999). The physiological evidence of responses to hypnotic analgesia stems, in the main, from: electroencephalographic (EEG) studies; somatasensory event-related potentials (SERP) studies; positron emission tomography (PET) studies; studies on spinal mechanisms; and studies on the different components of pain. The following does not intend to be an exhaustive review of the literature on the physiological correlates of laboratory pain modulation, as this is beyond the scope of this chapter, but will provide a backdrop to the current study.

6.1.3.1. EEG studies

Extensive experimental work involving surface EEG recordings made during hypnotic analgesia have indicated some specific physiological correlates. The most consistent finding in this area is that theta power (3-7 Hz) is related to hypnotic suggestibility (Crawford, 1994). According to Crawford and Gruzelier (1992) theta rhythm is associated with the cognitive experience of suppressing awareness, as well as being linked with hypnotic suggestibility. In a review, Crawford (1994) reported that when assessing EEG correlates of experimental pain in non-hypnotic and hypnotic contexts in both high and low suggestibles, high suggestibles consistently generate more theta power (5.5-7 Hz) than lows during pain and hypnotic analgesia. High suggestibles show greater theta power, especially in the temporal regions, in the left hemisphere during the experience of pain, whereas this reverses and shifts towards greater theta power in the right hemisphere during hypnotic analgesia. Low suggestibles by comparison show little in terms of hemispheric differences.

Crawford (1994) interprets these results by relating these inhibitory patterns of theta activity to 'disattention', which results from suggestions for hypnotic analgesia. Crawford (1994) argues that high hypnotic suggestibility is an expression of special abilities to attend exclusively to suggested events and disattend to non-suggested events, which includes greater cognitive flexibility and a greater ability to shift from left to right hemispheric functioning. Nevertheless, a recent critical evaluation of the relationship between sustained

attentional abilities and hypnotic suggestibility by Jamieson and Sheehan (2002), questions the notion that a high level of hypnotic suggestibility is significantly positively related to sustained attentional ability. If hypnosis is seen as a temporal process (e.g. Gruzelier, 1998), although sustained and focussed attention may be a necessary pre-requisite of initiating hypnosis, it does not imply that hypnosis is itself a more efficient and enhanced state of focussed attention. It has been proposed that hypnosis involves the suspension of a higher order attention system (e.g. Crawford & Gruzelier, 1992; Woody & Bowers, 1994) and other anterior executive functions (Gruzelier, 1998, 2004). A recent study by Croft, Williams, Haenschel and Gruzelier (2002) provides support for this. They found that increased gamma activity (32-100 Hz) over pre-frontal scalp sites is related to the subjective experience of pain. This relationship was shown in the control condition (pre-hypnosis) for both high and low hypnotically suggestibles. However, following the induction of hypnosis, while the relationship remained in low suggestibles, it was no longer seen in high suggestibles. For highs, gamma was no longer related to their subjective experience. Croft et al., (2002) suggest that hypnotic analgesia with respects to the subjective experience of pain is underpinned by the dissociation of prefrontal cortex from other neural functions.

However, the picture is further complicated by the results of a unique study by De Pascalis, Magurano, Belusci & Chen (2001). They compared the analgesia effects produced by experimental conditions of relaxation, dissociated imagery, focused analgesia and placebo to a control condition, and found suggestions for dissociated imagery to be as effective as suggestions for focussed analgesia. This poses a problem for explanations of hypnotic analgesia purely in terms of attentional mechanisms, and more likely indicates that the mechanisms that underlie hypnotic analgesia are suggestion specific (Patterson & Jensen, 2003; Price, 1999). EEG studies do imply some role for attentional processes in hypnotic suggestibility, however the nature of this relationship is unclear (Jamieson & Sheehan, 2002).

6.1.3.2. Somatasensory event-related potentials

Somatosensory event-related potentials (SERPs) have been shown to be important indicators of pain, and have yielded some interesting findings (Crawford, Knebel, Kaplan, Vendemia, Xie, Jameson & Pribram 1998). For example, the late components of pain-associated ERP amplitudes (300-400 ms after stimulation) have been found to correlate positively with reported pain intensity and perceived pain level (e.g. Chen, Chapman & Harkins, 1979; Danziger, Fournier, Bouhassira, Michaud, De Broucker, Santarcangelo, Carli, Chertock & Willer, 1998). SERPs, which have been used as an index of pain, have shown reductions during hypnotic analgesia (e.g. Arendt-Nielsen, Zachariae & Bjerring, 1990; Crawford, 1994; De Pascalis, Magurano, Bellusci, 1999; Spiegel, Bierre & Rootenberg, 1989; Zachariae & Bjerring, 1994). However, some studies have not found this reduction (e.g. Meier, Klucken, Soyka & Bromm, 1993). Patterson and Jensen (2003) conclude that although SERP studies demonstrate an effect of suggested analgesia on a physiological response that is associated with pain intensity and is not under conscious control, they say very little concerning the actual physiological substrates of hypnotic analgesia.

6.1.3.3. Positron emission tomography (PET) studies

More, recently, studies using PET have helped identify the physiological correlates of hypnotic analgesia (e.g. Faymonville et al., 2000; Hofbauer et al., 2001; Rainville et al., 1997). In a seminal study, Rainville et al., (1997) used PET scans to investigate the brain activity of 8 high suggestibles exposed to hot water pain prior, during and after hypnotically suggested modulation of pain unpleasantness. The pattern of activations in response to hot water pain prior to suggested analgesia, involved anterior cingulate cortex, somatosensory cortex and rostral insula, all areas that have been shown by previous neuropsychological work to be associated with pain (Oakley & Halligan, 2005). Hypnotically induced suggested analgesia related changes for the affective component of pain were directly related to changes in anterior cingulate cortex, but not changes in the primary somatosensory cortex. Indicating that the anterior cingulate cortex could be the key brain area responsible for

modulating the experience of pain affect. In a follow-up study, Hofbauer et al., (2001) replicated the Rainville et al., (1997) study but this time used hypnotic suggestions for the modulation of pain intensity rather than pain affect. This time hypnotically induced analgesia related changes for the sensory component of pain, were directly related to the primary somatosensory cortex, with no significant modulation of activity in the anterior cingulate cortex. These studies show that direct suggestions for analgesia can produce clear and predictable changes in brain areas related to the modulation of pain affect (producing changes in the limbic system) and pain intensity (inhibition nociceptive signals arriving at the somatosensory cortex) – see also Oakley & Halligan (2005); Price (1996, 1999).

6.1.3.4. Spinal mechanisms

There is some evidence that the general mechanism that may underlie hypnotic analgesia is an inhibitory system that modulates nociceptive signals at the level of the spinal chord. Endogenous opiates have been shown to rely heavily for their analgesic effects on a descending spinal chord inhibitory mechanism (Price, 1996, 1999). Two studies have investigated whether endogenous opiates mediate hypnotic analgesia (Barber & Mayer, 1977; Goldstein & Hilgard, 1975). In both studies, pain thresholds increased in response to hypnotic suggestions for analgesia, however when nalaxone hydrochloride (an opiate antagonist) was introduced following hypnotic analgesia, the pain thresholds remained unaffected. These results indicate that endogenous opioids may not be responsible for hypnotic analgesia, however, research in this area is somewhat lacking, with only two studies investigating the role of endogenous opioids, and it is evident that more research is required before a definitive conclusion can be made regarding an opiate descending control mechanism (Price, 1996, 1999)

More recently, the involvement of descending inhibitory controls during hypnotic analgesia has been investigated using a measure of spinal nociceptive function – the spinal nociceptive (R-III) reflex (e.g. Danziger et al., 1998; Kiernan, Dane, Philips & Price, 1995). Kiernan et al., (1995) found the nociceptive reflex (R-III) to be significantly correlated with suggestions

for analgesia, although the activation of descending spinal modulation accounted for only a portion of the reduction of pain during hypnosis. In a subsequent study, Danziger et al., (1998) using similar methodology to Kiernan et al., (1998) found that 61% of the highly suggestible participants in their study showed a strong inhibition, and 39% of participants showed strong facilitation of the R-III reflex with hypnosis, therefore the activation of descending spinal modulation was only demonstrated in a sub-group of high suggestibles. Both studies indicate that although many highly suggestible individuals show a significant change in R-III reflex in response to hypnotic analgesia suggestions, the activation of descending spinal modulation does not appear to be the only mechanism that underlies hypnotic analgesia (De Benedittis, 2003)

6.1.3.5. Sensory vs. affective components

The notion that suggested hypnotic analgesia has differential effects on 'sensory' and 'affective' components of pain has been addressed by several studies (see Hilgard & Hilgard, 1994 for review). In one of the earlier studies, Price and Barber (1987), reported that both components were reduced following suggestions for hypnotic analgesia. However, the mean reduction in affective pain was much larger and consistent compared to the reduction in sensory pain. They found a small but statistically significant correlation between hypnotic suggestibility and sensory ratings of pain, but not affective ratings. Early studies in this area indicated that suggested hypnotic analgesia has a greater effect on affective dimensions of pain due possibly to their cognitive component, as opposed to the sensory dimensions, which possibly were more directly associated with the intensity of a noxious input.

However, a recent unique and influential study by Rainville, Carrier, Hofbauer, Bushnell and Duncan (1999) aimed to clarify the relationship between suggested hypnotic analgesia and the affective and sensory dimensions of pain that had been identified in the neuroimaging studies reviewed above. Rainville et al., (1999) conducted two experiments, one in which suggestions were selectively targeted toward altering the affective-unpleasantness dimension of pain, and another in which suggestions were selectively

targeted toward altering the sensory-intensity dimension of pain. In the first experiment, pain affect-unpleasantness was significantly modulated (i.e. increased or decreased), with no corresponding changes in pain sensation-intensity. In the second experiment, pain sensation-intensity was also significantly modulated, however, this time pain affect-unpleasantness was modulated in parallel. Hypnotic suggestibility was significantly correlated with pain affect-unpleasantness modulation in the first experiment, and with pain sensation-intensity in the second experiment.

Unlike previous studies, Rainville et al., (1999) demonstrated that hypnotic suggestions could selectively modulate the affective and the sensory dimensions pain. These results also have implications on the direction of causation between sensory and affective dimensions, indicated that although hypnotic suggestibility appears to be associated with reductions in pain affect when suggestions are solely targeted at the affective component of pain, it is not associated with pain affect, when pain affect is reduced in parallel as a consequence of pain intensity (Price, 1999) This recent evidence does not support the notion that hypnotic analgesia effects affective pain to a greater extent than sensory pain, and emphasises the importance of the wording of suggestions for analgesia (see also De Pascalis et al., 2001)

6.1.3.6. Summary

Investigations about the psychological and neurophysiological mechanisms and correlates of hypnotic analgesia strongly indicate the existence of multiple factors and mechanisms (Price, 1996, 1999). Research indicates that high suggestibles show different behavioural, subjective and cortical responding than low suggestibles. Both EEG and SERP studies indicate that physiological inhibitory processes may be involved in hypnotic analgesia. The recent influential work of Rainville and colleagues demonstrates that different dimensions of pain can be selectively modulated, with modulations of pain affect showing corresponding changes in the anterior cingulate cortex, whilst modulations of pain sensation showing corresponding changes in the somatasensory cortex. There is also

evidence that hypnotic analgesia may also involve to a certain extent descending spinal chord inhibitory mechanisms.

Perhaps the greatest shortcoming of research on hypnotic analgesia (as well as hypnosis in general) is that the effects of hypnosis and suggestion are not considered separately. In nearly all documented evidence, it is difficult to know to what extent 'hypnosis' was involved, and whether suggestions for analgesia alone, or suggestions for analgesia in a hypnotic context would have produced similar effects. The lack of non-hypnotic control conditions in much of the research prevents any clear conclusions regarding the relative effect of hypnotic versus non-hypnotic suggestions for analgesia. Moreover, most laboratory studies have specifically pre-selected high and low suggestible participants, and some have argued that little can be concluded regarding the importance of suggestibility, if medium suggestibles, which make up the majority of population, are not included in studies (e.g. Kirsch & Lynn, 1995).

Nevertheless, there is some evidence that points to greater analgesia in response to suggestions following a hypnotic induction, particularly in the few studies that have employed a repeated-measures design, with participants receiving the same suggestions with and without prior induction of hypnosis (e.g. Hilgard, Macdonald, Morgan & Johnson, 1978; Jacobs, Kurtz & Strube, 1995; Malone, Kurtz, & Strube, 1989; Stacher, Schuster, Bauer, Lahoda, Schulze, 1975). Based on decades of both experimental as well as clinical observations, it seems reasonable to claim that hypnotic inductions can at least facilitate the analgesia produced by suggestions (Barber, 1996; Barber & Adrian, 1982). Although, hypnotic inductions per se are not necessary for the elicitation of hypnotic phenomena (e.g. Barber & Calverley, 1964, 1965), it is important to keep in mind that the effect of the induction of hypnosis on suggestibility is substantial, comparable to psychological treatments in general and medical outcomes (see Chapter 3).

6.1.4. Study objectives

The consideration raised so far indicates that multiple factors within the psychosocial context of hypnotic procedures as well the experiences of participants may explain why hypnotic inductions facilitate responsiveness to suggestions for pain modulation. Study 2 investigated the effects of two of these factors, namely absorption and reduced critical thought, on suggestibility and demonstrated that instructions for both facilitated suggested responding over and above that produced by the hypnotic context. The findings provide some support for the view that absorption and reduced critical thought are important components of hypnosis.

The current study aimed to examine a wider range of potential relationships between absorption and reduced critical thought in relation to suggestibility, by assessing suggestions for pain modulation. There is evidence to indicate that there are ceiling effects for hypnotic suggestions for pain reduction (Kiernan et al., 1995; Rainville et al., 1999), and consequently suggestions designed to modulate pain in both directions were used, which has been an approach adopted by several researchers (Ardent-Nielsen et al., 1990; Kiernan et al., 1995; Meier et al., 1993; Rainville et al., 1999). A similar method to that used in Study 2 and by Rainville et al., (1999) was employed. In addition, the current study aimed to investigate the association between pain modulation and hypnotic suggestibility. High hypnotically suggestible participants (HHSp), medium hypnotically suggestible participants (MHSp) and low hypnotically suggestible participants (LHSp) received a pain stimulus twice in a non-hypnotic context, in the absence of any formal instructions or mention of hypnosis; and twice in a hypnotic context, following standard relaxation (RX condition), relaxation plus absorption (ABS condition) or relaxation plus reduced critical thought instructions (RCT condition). Before and during each pain stimulus all participants received suggestions for either an increase in pain or suggestions for a decrease in pain. Pain intensity and pain unpleasantness ratings were obtained during each pain stimulus. Levels of absorption, critical thought and relaxation were also measured.

The current study also addressed some of the recommendations made in the previous chapter for improvements. In contrast to Study 2, absorption and critical thought were measured in the non-hypnotic context, as well as the hypnotic context, thus controlling for variability in non-hypnotic levels of absorption and critical thought and allowing a more systematic examination of the effect of these factors. In Study 2 ratings for absorption and critical thought were in the 'either-or' format, which were deemed inadequate as they may mask important differences in individual responses and may not cover an adequate range. Moreover, ratings were for *each* suggestion, which was heavily dependent on very accurate long-term memory. Consequently absorption and critical thought, in the current study, were measured using visual analogue scales to assess the subtle variations in responses, and overall ratings for responses to pain modulation suggestions in both non-hypnotic and hypnotic contexts as whole were taken, as opposed to ratings for each suggestion. Another limitation of Study 2 concerned the scale used to measure critical thought, which appeared to address extraneous rather than critical thought. Due to this the descriptors and wording for the visual analogue scale used to measure critical thought in this study explicitly referred to *only* 'critical' and 'analytical' thought. In addition, the current study also incorporated a measure of 'typicality' to assess how 'authentic' the hypnotic inductions were perceived to be, as well an assessment of participants' awareness of hypnosis before, during and after the experiment.

Based on the results of Study 2, it was hypothesised that change in responses to suggestions for pain modulation would be significantly greater when instructions for absorption or reduced critical thought were given, compared with instructions for relaxation alone. In line with the data reviewed above, it was also expected that HHSp would show a greater *increase* in responses to pain modulation suggestions following a hypnotic induction, compared to LHSp and MHSp.

6.2 Method

6.2.1. Design

In contrast to Study 2, this study used suggestions for pain modulation as the dependent variable rather than items from standardised hypnotic suggestibility scales. The use of suggestions not reflected in these scales enabled the stratification of participants on the basis of their previously measured hypnotic susceptibility (before being assigned randomly to experimental/control groups), whilst still maintaining naivety concerning hypnosis and hypnotic procedures (see also chapter 5, section 5.2.1, for design considerations) This allowed the systematic examination of the association between hypnotic suggestibility and pain modulation. This study is the second of a series of experiments aimed to establish the effects of hypnosis and hypnotic procedures on suggestibility. The study did not attempt to investigate the effect of suggestion for pain modulation on pain per se, and consequently ratings of pain without suggestion were not obtained.

The effect of suggestions for pain increase and pain decrease was tested in a 3 x 3 x 2 (condition x hypnotic suggestibility x context) between-within design. Participants in each of the three experimental conditions (RX vs. ABS vs. RCT) received a pain stimulus twice in a non-hypnotic context (SA_1: first suggestibility assessment) and twice in a hypnotic context (SA_2: second suggestibility assessment). Before and during each pain stimulus, participants received suggestions either for increase in pain or suggestions for decrease in pain. Suggestions within each context were counterbalanced, i.e. participants received both suggestions for increase and decrease in pain, in both non-hypnotic and hypnotic contexts. However, the order of non-hypnotic and hypnotic assessments of pain modulation were not counterbalanced as recommended by Braffman and Kirsch (1999), and in line with the methodology used in Study 2.

6.2.2. Participants

In all 105 participants (48 males & 57 females) pre-selected for high, medium and low levels of hypnotic suggestibility, took part in this study. All participants were undergraduate university students, with the majority being medical or psychology students recruited from University College London. The age of participants ranged from 18-28, with a mean age of 20.70 years (SD = 2.00). The assessment of hypnotic suggestibility was carried out independently up to five years prior to the present study, using the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS-A: Shor & Orne, 1962). Participants were designated as: high hypnotically suggestible participants (HHSp) if behavioural scores were ≥ 9 and subjective scores were ≥ 32 on the HGSHS-A; medium hypnotically suggestible participants (MHSp) if behavioural scores were between 5-8 and subjective scores were between 17-31; and low hypnotically suggestible participants (LHSp) if behavioural scores were ≤ 4 and subjective scores were ≤ 16. Participants were randomly assigned to conditions with the restriction that there were at least 10 HHSp, 10 MHSp, and 10 LHSp in each of the following three conditions: RX (N=35, 11 high, 10 medium, 14 low); ABS (N=35, 10 high, 14 medium, 11 low); or RCT (N=35, 10 high, 13 medium, 12 low).

Great care was taken to ensure that participants had no knowledge that the investigators or experiment was related to hypnosis (see Procedure, section 6.2.6, for the questions participants were asked to respond to concerning the possible knowledge of the hypnosis component). The experimenters remained blind to the level of hypnotic suggestibility of all participants throughout the study and no mention of hypnosis or hypnotic suggestibility was made at any other time other than explicitly specified in the experimental conditions. Participants were contacted by telephone or e-mail and informed that their name had been selected from a large subject pool used in psychological research, and then were invited to participate in a study investigating 'the influence of state and context on thought, behaviour and pain'. The joint UCL/UCLH Committee on the Ethics of Human Research approved this study; informed consent was obtained from all participants.

6.2.3. Stimulation

Pain was produced by immersion of the hand up to the wrist in circulating water for 1 minute. The temperature of the water was adjusted individually, pre-experimentally, to produce pain intensity ratings > 40/100 at a level (45.0-47.5°C) that the participant could tolerate for the complete 1 minute stimulation (Rainville et al., 1999). Stimulation alternated between hands during the whole experiment, with half of the participants beginning with their right hand, and half with their left hand. The minimum inter-stimulus interval for a given hand was 5 minutes (Rainville et al., 1999).

6.2.4. Hypnotic inductions and pain modulation suggestions

Both instructions for establishing a hypnotic context after SA_1, and the three induction conditions used each consisting of initial relaxation instructions plus additional instruction for either relaxation (RX condition), absorption (ABS condition) and reduced critical thought (RCT condition) are described in Chapter 5, section 5.2.3 (instructions for relaxation, absorption and reduced critical thought presented in full in Appendix 5.4). Direct suggestions to modulate pain in both directions – suggestions for pain increase and suggestions for pain decrease (pain modulation suggestions presented in Appendix 6.1) - were adapted from Rainville et al., (1999). However, in contrast to the indirect suggestions to selectively modulate different dimensions of pain used by Rainville et al., (1999), suggestions used in this study were direct suggestions for pain modulation, and did not selectively target sensory or affective components of pain (see Introduction, section 6.1.3.5). All instructions and suggestions were recorded onto audio compact disc to maximise experimental control.

6.2.5. Measures

6.2.5.1. Pain ratings

Following the methodology of Rainville et al., (1999) participants gave separate numerical ratings (0-100) of the maximum pain intensity and pain unpleasantness experienced during each stimulation, with the emphasis that ratings should reflect what they actually felt during the stimulation, irrespective of what was suggested before or during the stimulation. Therefore, an *intensity* and *unpleasantness* rating following each suggestion for pain increase (*increase-intensity*: ↑INT; *increase-unpleasantness*:↑UNP) and each suggestion for pain decrease (*decrease-intensity*:↓INT; *decrease-unpleasantness*↓UNP), was recorded for every participant (pain score sheet presented in Appendix 6.2).

The distinction between pain intensity and pain unpleasantness was explained before each experiment, using separate visual analogue scales (VAS) (Price, McGrath, Rafii & Buckingham, 1983; Rainville et al., 1999). For the intensity scale '0' was defined as 'not at all intense' and '100' was designated as 'the most intense pain sensation imaginable'. For the unpleasantness scale, '0' was defined as 'not at all unpleasant,' and '100' denoted 'the most unpleasant pain imaginable' (pain intensity and unpleasantness scales presented in Appendix 6.3). The descriptors 'Burning'. 'Scalding', 'Stinging', 'Cutting' and 'Tingling' were added to the pain intensity VAS, to emphasise the sensory dimension of pain. Whilst, the descriptors 'Troublesome', 'Bothersome', 'Annoying', and 'Irritating' were added to the pain unpleasantness VAS, to clarify the affective dimension of pain (Hofbauer et al., 2001; Morin & Bushnell, 1998; Rainville et al., 1999). To avoid ceiling effects, participants were instructed that ratings could be below '0' or above '100' if lower or larger values were needed to describe sensations relative to previous ratings (Rainville et al., 1999). Participants were instructed to keep their eyes closed and visualise the scales when giving their numerical ratings for each stimulation (Rainville et al., 1999).

6.2.5.2. Absorption, critical thought and relaxation

Absorption, critical thought and relaxation were assessed following SA_1 (non-hypnotic context) and SA_2 (hypnotic context). Absorption scores were obtained by asking participants to mark on a VAS (0 = *not at all absorbed; as distracted as I can be;* 100 = *completely absorbed; as focussed as I can be*), how absorbed they were during the instructions for pain modulation. A high rating indicated that the participant was highly absorbed or focussed, whilst a low rating inferred that the participant found it difficult to become absorbed or focus their attention.

Critical thought scores were obtained by asking participants to mark on a VAS (0 = *very few critical/analytical thoughts*; 100 = *lots of critical/analytical thoughts*), how many critical or analytical thoughts they had during the instructions for pain modulation. A high score indicated that the participant thought critically about the suggestions, whereas a low score inferred that the participant had little or no critical thoughts and did not critically analyse. Relaxation scores were also measured by asking participants to mark a VAS (0 = *as un-relaxed as I can be*; 100 = *as relaxed as I can be*). (VASs for absorption, critical thought and relaxation are presented in Appendix 6.4.)

6.2.6. Procedure

Participants were tested individually in a quiet room, which had no link with hypnosis research. Upon arrival they were informed about the nature of the pain stimulus and were given an information sheet, which explained that the experiment was designed to investigate 'the influence of state and context on thought, behaviour and pain'. Any reference to hypnosis was strictly avoided. The information sheet emphasised that participants were free to withdraw from the study at any point, without having to give a reason. After written consent was given, the temperature of the water was adjusted individually in pre-experimental trials to gauge a suitable pain stimulus for each participant for the actual experiment (see section 6.2.3). Subsequently, participants were presented with the first

assessment of suggestibility for pain modulation (SA_1). After scoring SA_1 and the measurement of levels of absorption/critical thought/relaxation, a hypnotic context was explicitly established. Participants were informed that the remaining part of the study would be similar in content to the part they had completed, however the second part would follow the induction of hypnosis. At this point participants were not aware that hypnosis was relevant to the experiment and therefore were given an explicit opportunity to withdraw from the study. All participants were then given standard progressive relaxation instructions, plus additional instructions for either relaxation or absorption or reduced critical thought depending on which experimental condition that had been assigned to. The second assessment of suggestibility for pain modulation (SA_2) was then presented and levels of absorption/critical thought/relaxation were measured for the second time. At the end of the session participants were asked to respond to a set of questions that asked what they thought the experiment was about: *i) before they arrived at the testing session; ii) after the first set of suggestions for pain modulation;* and *iii) after the second set of suggestions for pain modulation* (the post-experimental questionnaire comprised of these questions is presented in Appendix 6.5). Finally, participants were asked to mark on a VAS how typical of hypnosis they thought the induction they received was (0 = *not at all typical of hypnosis*; 100 = *completely typical of hypnosis*); and how hypnotised they felt following the hypnotic induction (0 = *not at all hypnotised*; 100 = *completely hypnotised*)

6.2.7. Statistical analyses

SPSS for Mac OS X (version 11.0) was used for the analyses of data. The effects of Condition and Hypnotic Suggestibility on each pain measure (i.e.↑INT;↑UNP;↓INT;↓UNP) were tested using a 3 x 3 x 2 (condition x hypnotic suggestibility x context) between-within analyses of covariance (ANCOVA), taking pain modulation scores at SA_1 as the covariate. Comparison of the means were carried out by Fisher's protected least significant difference (LSD) test, to determine differences between: (i) conditions and (ii) level of hypnotic suggestibility, with regard to each measure of pain. Paired-samples Student's t-test were

carried out to compare scores for responsiveness to pain modulation suggestions in a non-hypnotic context (SA_1) with scores in a hypnotic context (SA_2), with respects to Condition and Hypnotic Suggestibility. As in Study 2, a rejection region with at least a value of $p < 0.05$ was selected and used throughout (Tabachnick & Fidell, 2001).

6.3. Results

Naivety concerning the experiment involving hypnosis and hypnotic procedures was maintained throughout the study for almost all participants. However, three participants from the Absorption condition (1 HHSp & 2 LHSp); one participant from the Relaxation condition (a HHSp); and one participant from the RCT condition (a LHSp) reported that the experiment *might have* been related to hypnosis after the first assessment of suggestibility for pain modulation (SA_1). Means and correlations were calculated for both the full sample and sub-sample of participants who reported no awareness or suspicion that the study concerned hypnosis. The patterns of means and correlations were virtually identical for the two data sets, so analyses of the full sample are reported here.

Means and standard deviations of responses to suggestions for pain increase and pain decrease, in non-hypnotic (SA_1) and hypnotic (SA_2) contexts, are presented in Table 6.1, Table 6.2, Figure 6.1 and Figure 6.2. As an important part of the analyses, quantification of the effect of condition on responsiveness to suggestions for pain modulation was calculated (see Tables 6.1 and 6.2). The data was screened for univariate and multivariate outliers. The data was normally distributed, with no skewness and kurtosis values exceeding standardised scores of ± 3.29 ($p < .001$, two-tailed test). Mahalanobis distances (critical values, $\chi^2_{(8)} = 26.125$, $p < .001$) were calculated and no cases were found to have Mahalanobis distances greater than the critical value, demonstrating the absence of multivariate outliers. The effect of side stimulated and any possible interactions were non-significant ($ps > .10$). This factor was dropped from analyses and data were averaged across hands.

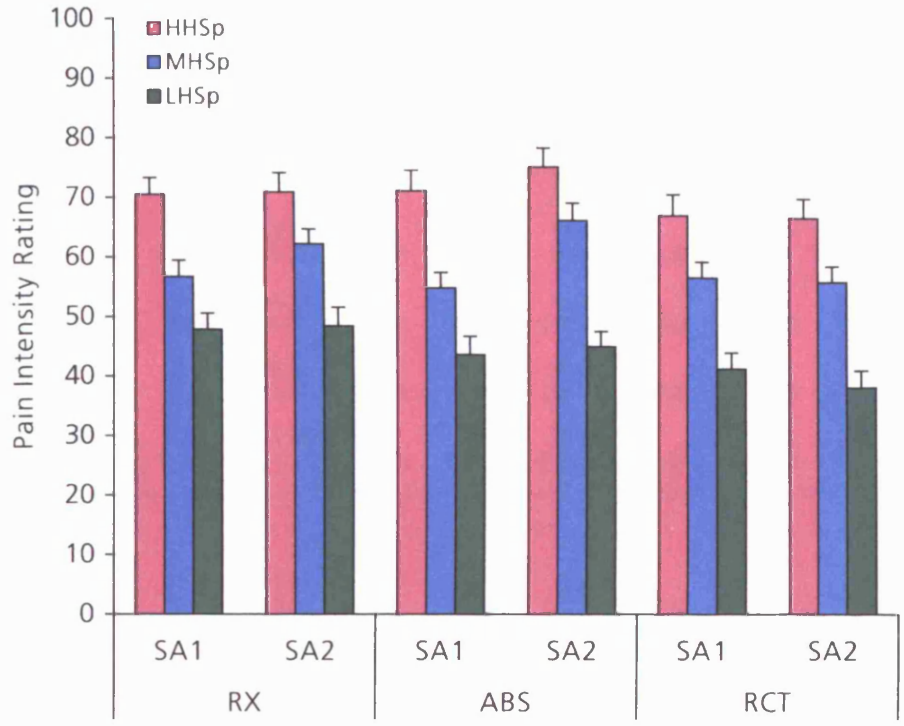
Table 6.1. Mean (standard deviation) responses to suggestions for *pain increase* in both non-hypnotic (SA_1) and hypnotic (SA_2) contexts

Suggestions for Pain Increase & Hypnotic Suggestibility	RX			ABS			RCT			Overall
	SA_1	SA_2	Effect Size	SA_1	SA_2	Effect Size	SA_1	SA_2	Effect Size	
↑INT										
HHSp	70.46 (9.34)	70.91 (10.68)	0.05	71.10 (11.08)	75.20 (10.15)	0.41	67.00 (11.11)	66.50 (10.29)	-0.05	70.29 (9.75)
MHSp	56.70 (8.69)	62.20 (7.86)	0.70	54.86 (9.58)	66.21 (10.73)	1.16	56.54 (9.68)	55.77 (9.32)	-0.08	58.84 (8.52)
LHSp	47.86 (9.94)	48.43 (11.76)	0.05	43.64 (10.27)	45.00 (8.37)	0.15	41.25 (9.32)	38.08 (10.02)	-0.34	44.53 (9.32)
Overall	57.71 (13.67)	59.20 (13.70)	0.11	55.97 (14.69)	62.97 (14.94)	0.48	54.43 (14.13)	52.77 (15.04)	-0.12	
↑UNP										
HHSp	61.82 (10.31)	64.09 (10.91)	0.22	66.70 (10.00)	70.70 (9.51)	0.43	61.00 (11.74)	60.00 (10.54)	-0.09	64.02 (10.48)
MHSp	51.50 (9.73)	57.50 (8.90)	0.68	50.50 (9.74)	61.21 (11.98)	1.02	50.77 (9.97)	50.15 (10.34)	-0.06	53.59 (9.10)
LHSp	40.00 (8.99)	37.93 (9.47)	-0.23	38.64 (8.97)	42.09 (9.75)	0.39	42.50 (9.17)	41.17 (9.30)	-0.15	40.31 (7.72)
Overall	50.14 (13.20)	51.74 (15.10)	0.11	51.40 (14.43)	57.91 (15.50)	0.44	50.86 (12.40)	49.89 (12.33)	-0.08	

Note.

↑INT ratings are intensity ratings (0 = not at all intense; 100 = the most intense pain imaginable) for each suggestion for pain increase. ↑UNP ratings are unpleasantness ratings (0 = not at all unpleasant; 100 = the most unpleasant pain imaginable) for each suggestion for pain increase

Figure 6.1. Mean (standard error) intensity and unpleasantness ratings following suggestions for *pain increase*, for the relaxation (RX), absorption (ABS) and reduced critical thought (RCT) conditions



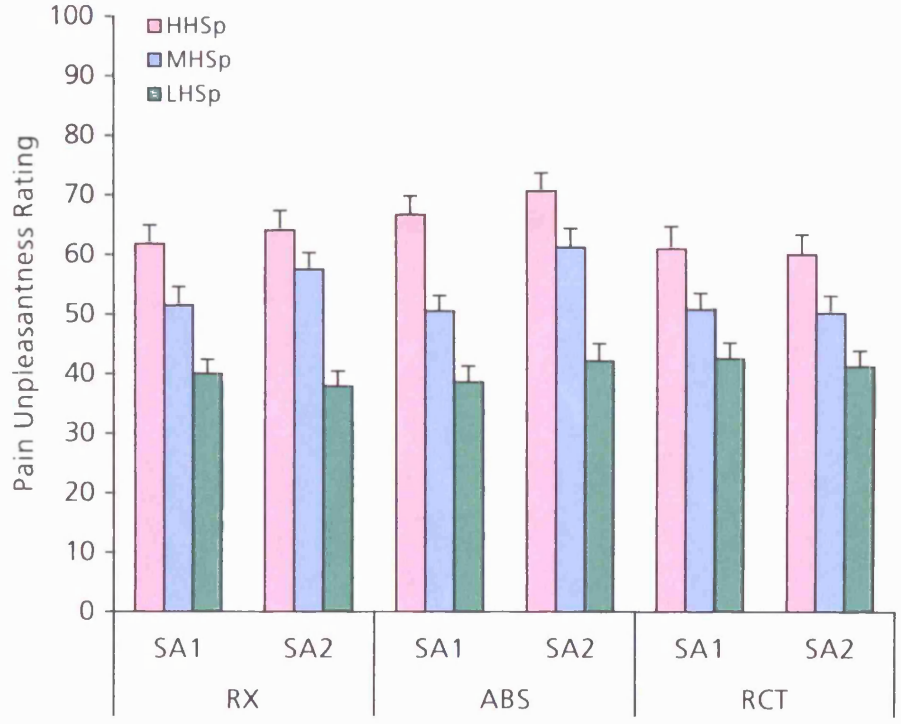


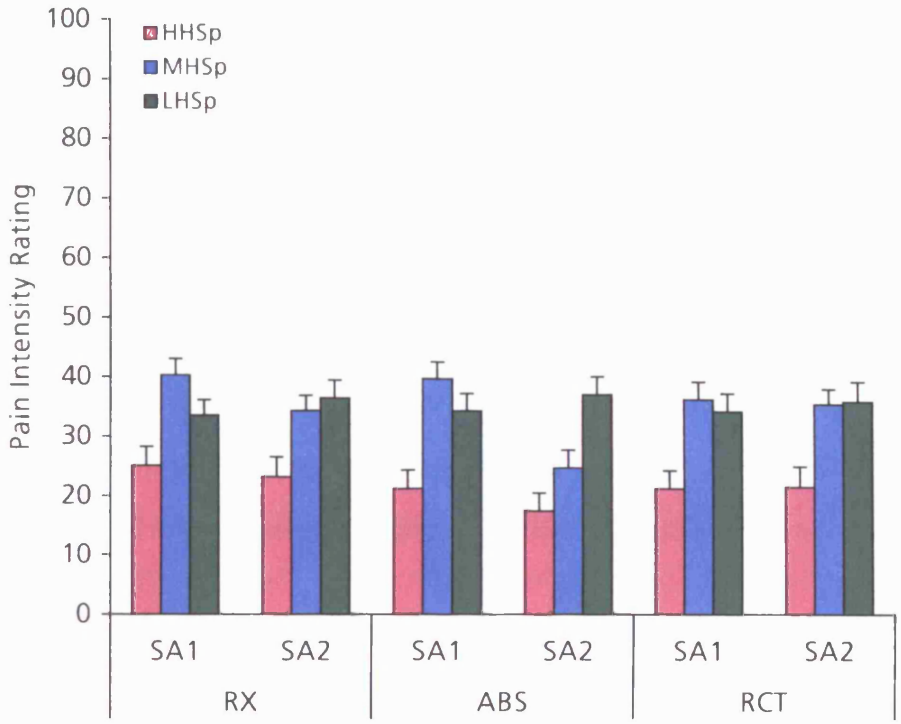
Table 6.2. Mean (standard deviation) responses to suggestions for *pain decrease* in both non-hypnotic (SA_1) and hypnotic (SA_2) contexts

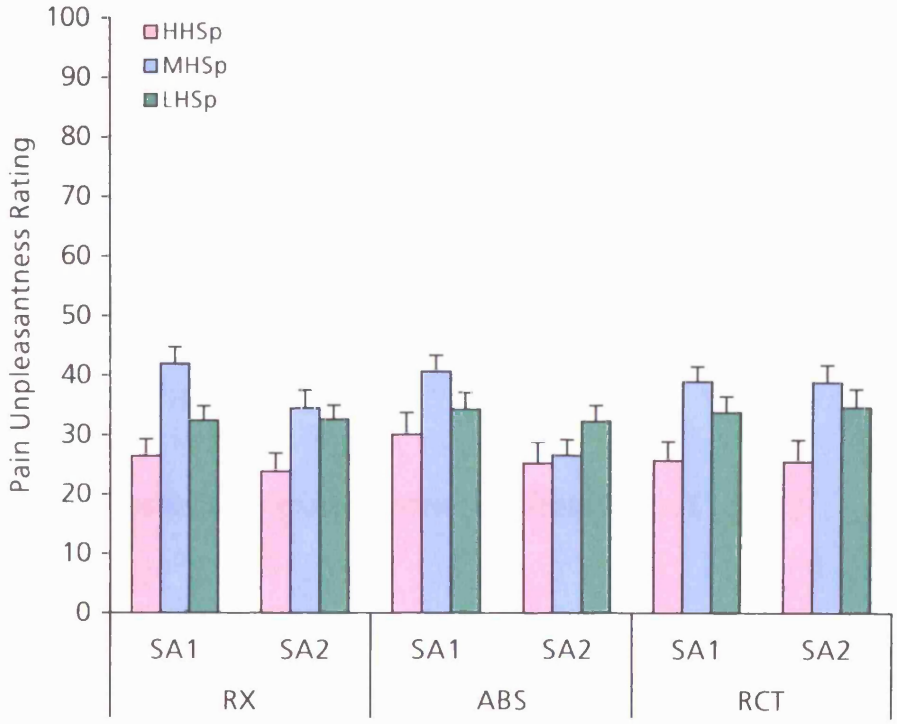
Suggestions for Pain Decrease & Hypnotic Suggestibility	RX			ABS			RCT			Overall
	SA_1	SA_2	Effect Size	SA_1	SA_2	Effect Size	SA_1	SA_2	Effect Size	
↓INT										
HHSp	25.09 (10.50)	23.18 (11.02)	0.19	21.20 (9.94)	17.50 (9.66)	0.40	21.20 (9.72)	21.50 (10.81)	-0.03	21.69 (9.91)
MHSp	40.30 (8.55)	34.30 (8.19)	0.76	39.64 (10.65)	24.71 (11.17)	1.42	36.15 (10.83)	35.39 (9.23)	0.08	34.82 (8.99)
LHSp	33.50 (9.84)	36.43 (11.31)	-0.29	34.27 (9.74)	37.00 (10.05)	-0.29	34.17 (10.41)	35.83 (11.48)	-0.16	35.18 (9.35)
Overall	32.80 (11.17)	31.66 (11.78)	0.10	33.54 (12.77)	25.66 (12.01)	0.64	31.20 (11.97)	31.57 (11.87)	-0.03	
↓UNP										
HHSp	26.46 (9.31)	23.91 (10.05)	0.28	30.10 (11.56)	25.30 (11.29)	0.44	25.70 (10.08)	25.50 (11.41)	0.02	26.13 (9.82)
MHSp	42.00 (8.88)	34.50 (9.56)	0.86	40.71 (10.16)	26.50 (10.04)	1.46	38.92 (9.25)	38.77 (10.58)	0.02	36.70 (8.87)
LHSp	32.43 (9.09)	32.64 (8.99)	-0.02	34.36 (9.24)	32.27 (9.04)	0.24	33.75 (9.32)	34.58 (10.76)	-0.09	33.30 (8.58)
Overall	33.29 (10.76)	30.43 (10.27)	0.28	35.69 (10.96)	27.97 (10.26)	0.74	33.37 (10.69)	33.54 (11.89)	-0.02	

Note.

↓INT ratings are intensity ratings (0 = *not at all intense;* 100 = *the most intense pain imaginable*) for each suggestion for pain decrease. ↓UNP ratings are unpleasantness ratings (0 = *not at all unpleasant;* 100 = *the most unpleasant pain imaginable*) for each suggestion for pain decrease. A decrease in pain ratings from SA_1 to SA_2, following suggestions for pain decrease, is actually an increase in responsiveness to suggestion.

Figure 6.2. Mean (standard error) intensity and unpleasantness ratings following suggestions for *pain decrease*, for the relaxation (RX), absorption (ABS) and reduced critical thought (RCT) conditions





6.3.1. Suggestions for pain increase: intensity (↑INT)

The ANCOVA for ↑INT ratings evidenced a main effect for Condition [$F_{(2,95)} = 11.779$, $p < 0.001$] and Hypnotic Suggestibility [$F_{(2,95)} = 13.861$, $p < 0.001$]. The interaction between Condition and Hypnotic Suggestibility was non-significant. The main effect for Condition revealed that change in ↑INT ratings from SA_1 to SA_2 was significantly different between: (i) ABS and RX conditions [LSD test, $p < 0.05$]; (ii) ABS and RCT conditions [LSD test, $p < 0.001$] and (iii) RX and RCT conditions [LSD test, $p < 0.025$]. The main effect for Hypnotic Suggestibility revealed that the change in ↑INT ratings was significantly different between: (i) HHSp and LHSp [LSD test, $p < 0.001$]; and (ii) MHSp and LHSp [LSD test, $p < 0.001$]. The difference in ↑INT ratings change between HHSp and MHSp was not significant.

There were no significant differences in ↑INT ratings for Condition at SA_1. Paired samples t-tests indicated that ↑INT ratings from SA_1 to SA_2 significantly increased only for the ABS condition [$t_{(34)} = 4.385$, $p < 0.001$]. No significant differences in ↑INT from SA_1 to SA_2 were found for either the RX or RCT conditions. With respect to Hypnotic Suggestibility, there were significant differences in ↑INT ratings at SA_1. Post-hoc comparisons of the means (LSD test, alpha = 0.05) indicated that ↑INT ratings at SA_1 were significantly greater for HHSp compared to MHSp, which in turn were significantly greater than LHSp. Paired-samples t-tests indicated that ↑INT ratings from SA_1 to SA_2 significantly increased only for MHSp [$t_{(36)} = 3.728$, $p < 0.001$]. No significant differences in ↑INT from SA_1 to SA_2 were found for either HHSp or LHSp.

6.3.2. Suggestions for pain increase: unpleasantness (↑UNP)

The ANCOVA for ↑UNP ratings revealed a main effect for Condition [$F_{(2,95)} = 7.137$, $p < 0.001$] and Hypnotic Suggestibility [$F_{(2,95)} = 10.334$, $p < 0.001$]. The interaction between Condition and Hypnotic Suggestibility was non-significant. The main effect for Condition revealed that change in ↑UNP ratings from SA_1 to SA_2 was significantly different between:

(i) ABS and RX conditions [LSD test, $p < 0.025$]; and (ii) ABS and RCT conditions [LSD test, $p < 0.001$]. The difference in ↑UNP ratings change between the RX and RCT conditions was non-significant. The main effect for Hypnotic Suggestibility revealed that change in ↑UNP ratings was significantly different between: (i) HHSp and LHSp [LSD test, $p < 0.001$]; and (ii) MHSp and LHSp [LSD test, $p < 0.001$]. The difference in ↑UNP ratings change between HHSp and MHSp was not significant.

There were no significant differences in ↑UNP ratings for Condition at SA_1. Paired samples t-tests indicated that ↑UNP ratings from SA_1 to SA_2 significantly increased for the ABS condition [$t_{(34)} = 3.972$, $p < 0.001$]. No significant differences in ↑UNP from SA_1 to SA_2 were found for either the RCT or RX conditions. Concerning Hypnotic Suggestibility, there were significant differences in ↑UNP ratings at SA_1. Post-hoc comparisons of the means (LSD test, alpha = 0.05) indicated that ↑UNP ratings at SA_1 were significantly greater for HHSp compared to MHSp, which in turn were significantly greater than LHSp. Paired-samples t-tests indicated that ↑UNP ratings from SA_1 to SA_2 significantly increased for MHSp [$t_{(36)} = 3.125$, $p < 0.01$] and approached significance for HHSp [$t_{(30)} = 1.931$, $p = 0.063$]. No significant difference in ↑UNP from SA_1 to SA_2 was found for LHSp.

6.3.3. Suggestions for pain decrease: intensity (↓INT)

The ANCOVA for ↓INT ratings revealed a main effect for Condition [$F_{(2,95)} = 9.124$, $p < 0.001$]; and Hypnotic Suggestibility [$F_{(2,95)} = 9.397$, $p < 0.001$]. The interaction between Condition and Hypnotic Suggestibility was non-significant. The main effect for Condition revealed that change in ↓INT ratings from SA_1 to SA_2 was significantly different between: (i) ABS and RX conditions [LSD test, $p < 0.01$]; and (ii) ABS and RCT conditions [LSD test, $p < 0.001$]. The difference in ↓INT ratings change between the RX and RCT conditions was not significant. The main effect for Hypnotic Suggestibility revealed that change in ↓INT ratings was significantly different between: (i) HHSp and LHSp [LSD test, $p < 0.01$]; and

(ii) MHSp and LHSp [LSD test, $p < 0.001$]. The difference in ↓INT ratings change between HHSp and MHSp was not significant.

There were no significant differences in ↓INT ratings for Condition at SA_1. Paired samples t-tests indicated that ↓INT ratings from SA_1 to SA_2 significantly decreased for the ABS condition [$t_{(34)} = -4.765$, $p < 0.001$]. No significant differences in ↓INT ratings from SA_1 to SA_2 were found for either RX or RCT conditions. In relation to Hypnotic Suggestibility, there were significant differences in ↓INT ratings at SA_1. Post-hoc comparisons of the means (LSD test, alpha = 0.05) indicated that ↓INT ratings at SA_1 were significantly lower for HHSp compared to MHSp and LHSp. Paired-samples t-tests indicated that ↓INT ratings from SA_1 to SA_2 significantly decreased for MHSp [$t_{(36)} = -4.349$, $p < 0.001$] and HHSp [$t_{(30)} = -2.088$, $p < 0.05$]. No significant difference in ↓INT from SA_1 to SA_2 was found for LHSp.

6.3.4. Suggestions for pain decrease: unpleasantness (↓UNP)

The ANCOVA for↓UNP ratings revealed a main effect for Condition [$F_{(2,95)} = 7.374$, $p < 0.001$]; and Hypnotic Suggestibility [$F_{(2,95)} = 4.945$, $p < 0.01$]. The interaction between Condition and Hypnotic Suggestibility was non-significant. The main effect for Condition revealed that change in ↓UNP ratings from SA_1 to SA_2 was significantly different between: (i) ABS and RX conditions [LSD test, $p < 0.05$]; (ii) ABS and RCT conditions [LSD test, $p < 0.001$]. The difference in ↓UNP ratings change between RX and RCT conditions was not significant. The main effect for Hypnotic Suggestibility revealed that change in ↓UNP ratings was significantly different between: (i) HHSp and LHSp [LSD test, $p < 0.05$]; and (ii) MHSp and LHSp [LSD test, $p < 0.01$]. The difference in ↓UNP ratings change between HHSp and MHSp was not significant.

There were no significant differences in ↓UNP ratings for Condition at SA_1. Paired samples t-tests indicated that ↓UNP ratings from SA_1 to SA_2 significantly decreased for the ABS condition [$t_{(34)} = -4.756$, $p < 0.001$] and the RX [$t_{(34)} = -2.473$, $p < 0.025$]. No significant difference in ↓UNP was found for the RCT condition. Regarding Hypnotic Suggestibility,

there were significant differences in ↓UNP ratings at SA_1. Post-hoc comparisons of the means (LSD test, $p < 0.05$) indicated that ↓UNP ratings at SA_1 were significantly lower for HHSp compared to MHSp and LHSp. Paired-samples t-tests indicated that ↓UNP ratings from SA_1 to SA_2 significantly decreased for MHSp [$t_{(36)} = -4.065$, $p < 0.001$] and HHSp [$t_{(30)} = -2.112$, $p < 0.05$]. No significant difference in ↓UNP from SA_1 to SA_2 was found for LHSp.

6.3.5. Absorption, critical thought and relaxation

Means and standard deviations of self-reported relaxation, absorption and critical thought are presented in Table 6.3 and Figure 6.3. All ratings were measured in relation to both non-hypnotic (SA_1) and hypnotic contexts (SA_2). Hierarchical multiple regression analyses were performed to measure whether self-ratings of absorption, critical thought and relaxation predicted ↑INT, ↑UNP, ↓INT and ↓UNP measures of hypnotic responsiveness to pain modulation suggestions (SA_2). Hypnotic response ratings (SA_2) were entered as the dependent variable. Non-hypnotic response ratings, Condition and Hypnotic Suggestibility were used as covariates and entered in block 1. Change in absorption, critical thought and relaxation scores (i.e. change between non-hypnotic and hypnotic contexts) were entered in block 2 in stepwise fashion. Stepwise regression was used, as the IVs used in these analyses could not be assigned theoretical importance with regard responsiveness to pain modulation suggestions.

Non-hypnotic ↑INT ratings, Hypnotic Suggestibility and self-reported Absorption all significantly predicted hypnotic ↑INT ratings, with variance associated with the other variables controlled (non-hypnotic responses: $\beta = 0.574$, $p < 0.001$; hypnotic suggestibility: $\beta = 0.261$, $p < 0.01$; absorption: $\beta = 0.218$, $p < 0.001$). Together these variables accounted for 69.4% of the variance in hypnotic responses, with absorption uniquely accounting for 4.6% of the variance in hypnotic ↑INT ratings. Condition, relaxation ratings and critical thought ratings did not significantly predict change in ↑INT ratings.

Table 6.3. Mean (standard deviations) ratings for relaxation, absorption and critical thought in non-hypnotic (SA_1) and hypnotic (SA_2) contexts

Condition	Rating					
	Relaxation		Absorption		Critical Thought	
	SA_1	SA_2	SA_1	SA_2	SA_1	SA_2
RX	70.76 (15.72)	82.07 (16.59)	67.24 (17.56)	72.34 (19.16)	37.39 (23.48)	30.66 (22.70)
ABS	71.57 (13.86)	83.69 (14.74)	66.31 (14.48)	80.76 (12.47)	36.09 (21.25)	21.59 (17.21)
RCT	70.16 (19.44)	82.05 (17.05)	64.91 (15.66)	71.61 (16.37)	33.61 (23.54)	34.64 (27.05)

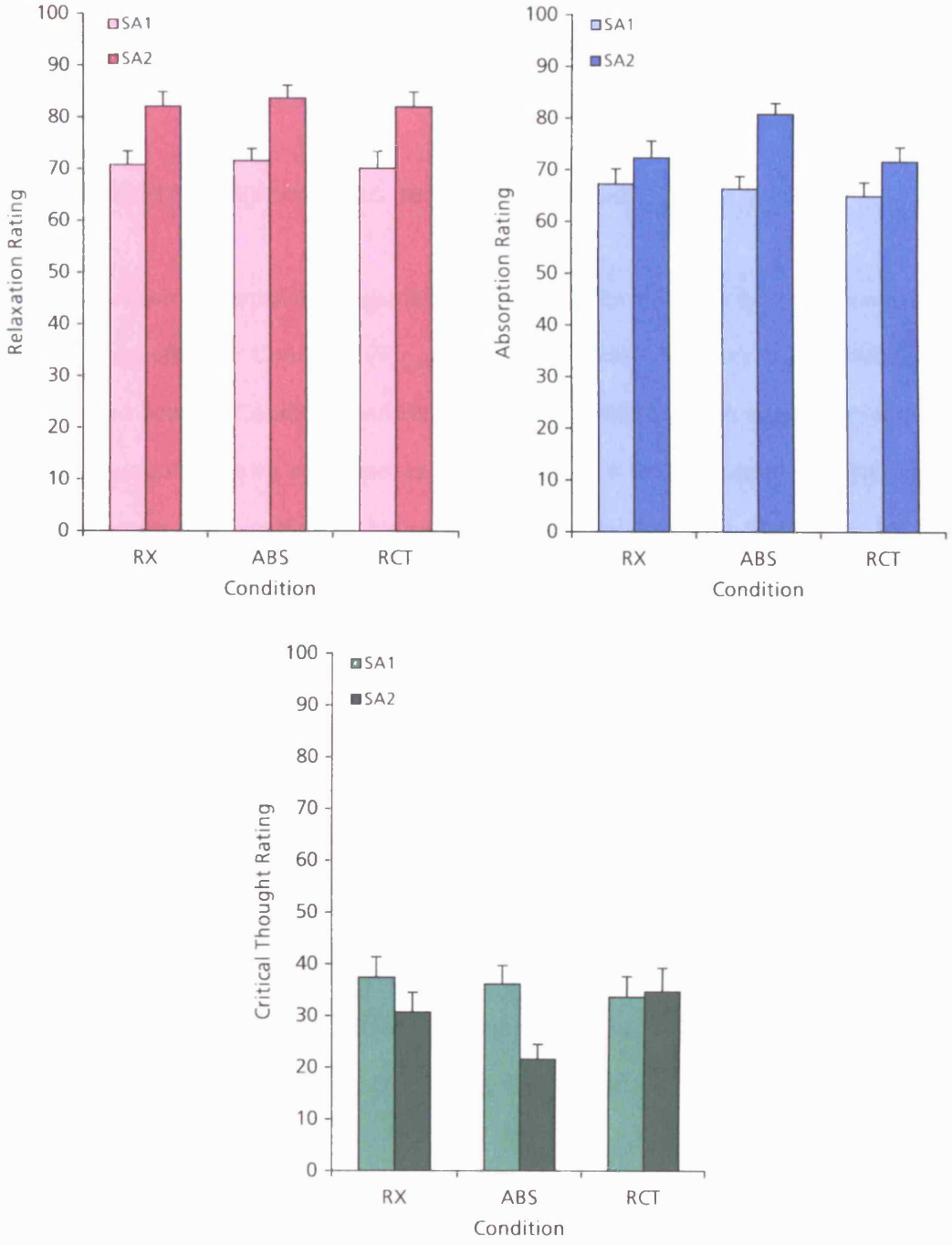
Note.

Relaxation, Absorption and Critical Thought ratings *were rated out of 100.*

A similar pattern of results was found for ↑UNP ratings, with non-hypnotic ↑UNP ratings, Hypnotic Suggestibility and self-reported Absorption all significantly predicted hypnotic ↑UNP ratings, with variance associated with the other variables controlled (non-hypnotic responses: $\beta = 0.566$, $p < 0.001$; hypnotic suggestibility: $\beta = 0.205$, $p < 0.025$; absorption: $\beta = 0.291$, $p < 0.001$). Together these variables accounted for 65.2% of the variance in hypnotic responses, with absorption uniquely accounting for 8.2% of the variance in hypnotic ↑UNP ratings. Again, neither Condition nor relaxation nor critical thought ratings significantly predict change in ↑UNP ratings.

Three variables were found to predict hypnotic ↓INT ratings, when variance of the other variables was controlled (non-hypnotic responses: $\beta = 0.661$, $p < 0.001$; absorption: $\beta = 0.271$, $p < 0.01$; critical thought: $\beta = 0.181$, $p < 0.05$). Together these variables accounted for 51.5% of the variance in hypnotic responses, with absorption uniquely accounting for 6.9% and critical thought uniquely accounting for 3.1% of the variance in hypnotic ↓INT ratings. Condition, hypnotic suggestibility, and relaxation ratings did not significantly predict change in ↓INT ratings.

Figure 6.3. Mean (standard error) ratings for relaxation, absorption and critical thought, for the relaxation (RX), absorption (ABS) and reduced critical thought (RCT) conditions



In relation to ↓UNP ratings, non-hypnotic ↓UNP ratings, Hypnotic Suggestibility and self-reported Absorption all significantly predicted hypnotic ↓UNP ratings, with variance associated with the other variables controlled (non-hypnotic responses: $\beta = 0.711$, $p < 0.001$; hypnotic suggestibility: $\beta = 0.157$, $p < 0.05$; absorption: $\beta = 0.232$, $p < 0.01$). Together these

variables accounted for 56.0% of the variance in hypnotic responses, with absorption uniquely accounting for 4.7% of the variance in hypnotic ↓UNP ratings. Condition, relaxation ratings and critical thought ratings did not significantly predict change in ↓UNP ratings.

6.3.6. Typicality of hypnosis and 'feeling hypnotised'

A 3 x 3 (Condition vs. Hypnotic Suggestibility) ANCOVA for typicality of hypnosis scores revealed a main effect for Condition [$F_{(2,95)} = 9.023$, $p < 0.001$]. Hypnotic Suggestibility and the interaction between Condition and Hypnotic Suggestibility was non significant (*ps* > 0.10). Post-hoc comparisons of the means (LSD test, alpha = 0.05) indicated that typicality of hypnosis scores were significantly higher for the ABS condition ($M = 69.56$, $SD = 16.26$) in comparison with (i) the RX condition ($M = 59.43$, $SD = 17.29$); and (ii) the RCT condition ($M = 53.59$, $SD = 16.88$).

A 3 x 3 (Condition vs. Hypnotic Suggestibility) ANCOVA for 'feeling hypnotised' scores revealed a main effect for Condition [$F_{(2,95)} = 9.491$, $p < 0.001$]. Hypnotic Suggestibility and the interaction between Condition and Hypnotic Suggestibility was non significant (*ps* > 0.10). Similar to typicality of hypnosis scores, post-hoc comparisons of the means (LSD test, alpha = 0.05) indicated that 'feeling hypnotised' scores were significantly higher for the ABS condition ($M = 60.53$, $SD = 16.93$) in comparison with (i) the RX condition ($M = 44.61$, $SD = 15.73$); and (ii) the RCT condition ($M = 45.96$, $SD = 16.76$).

6.3.7. Manipulation check

3 x 3 x 2 (Condition vs. Hypnotic Suggestibility vs. Context) between-within ANCOVAs, controlling for baseline scores, were used to analyse whether the inductions used, actually produced the effects (i.e. increased absorption and reduced critical thought) that they were designed for.

The ANCOVA for self-reported absorption revealed a main effect for Condition [$F_{(2,95)} = 4.898$, $p < 0.01$]. Hypnotic Suggestibility and the interaction between Condition and Hypnotic Suggestibility was non significant (*ps* > 0.10). Post-hoc comparisons of the means (LSD test, alpha = 0.05) indicated that change in self-reported absorption from SA_1 to SA_2 was significantly greater for the ABS condition in comparison to (i) the RX condition; and (ii) the RCT condition. There were no significant differences in self-reported absorption for Condition at SA_1. Paired samples t-tests indicated that self-reported absorption scores significantly increased, from SA_1 to SA_2, for all three conditions: ABS [$t_{(34)} = 6.934$, $p < 0.001$]; RX [$t_{(34)} = 2.525$, $p < 0.025$]; and RCT [$t_{(34)} = 2.479$, $p < 0.025$].

The ANCOVA for self-reported critical thought revealed a main effect for Condition [$F_{(2,95)} = 4.909$, $p < 0.01$]. Hypnotic Suggestibility and the interaction between Condition and Hypnotic Suggestibility was non significant (*ps* > 0.10). Post-hoc comparisons of the means (LSD test, alpha = 0.05) indicated that change in self-reported critical thought from SA_1 to SA_2 was only significantly greater for the ABS condition when compared to the RCT condition. There were no significant differences in self-reported critical thought for Condition at SA_1. Paired samples t-tests indicated that self-reported critical thought scores significantly decreased (i.e. a reduction in critical thought), from SA_1 to SA_2, only for the ABS condition [$t_{(34)} = -5.934$, $p < 0.001$]. No significant differences in self-reported critical thought scores were found for either the RX or RCT conditions.

The ANCOVA for self-reported relaxation revealed no significant effects for Condition, Hypnotic Suggestibility or the interaction between Condition and Hypnotic suggestibility (*ps* > 0.1). There were no significant differences in self-reported relaxation for Condition at SA_1. Paired samples t-tests indicated that self-reported relaxation scores significantly increased, from SA_1 to SA_2, for all three conditions: ABS [$t_{(34)} = 4.625$, $p < 0.001$]; RX [$t_{(34)} = 4.574$, $p < 0.001$]; and RCT [$t_{(34)} = 3.737$, $p < 0.001$].

6.4. Discussion

6.4.1. Effect of condition on responses to pain modulation suggestions

This study set out to examine a wider range of potential relationships between absorption and reduced critical thought in relation to suggestibility, by assessing suggestions for pain modulation. In line with expectation, responsiveness to pain modulation suggestions for each pain rating (i.e.↑INT;↑UNP;↓INT;↓UNP) increased significantly (from SA_1 to SA_2) following the inclusion of instructions for absorption (ABS condition). The mean effect sizes of adding instructions for absorption to a hypnotic induction on responsiveness to pain modulation suggestions were substantial, especially for suggestions for pain decrease, varying from 0.44 to 0.74. However, contrary to the findings of Study 2, responses to pain modulation suggestions, for each pain rating, did not significantly increase following the inclusion of instructions for reduced critical thought (RCT condition). With regard to the RX condition, only ↓UNP ratings were found to significantly decrease following instructions for just relaxation. Moreover, the results indicate that increases in responsiveness to pain modulation suggestions for each pain rating were significantly higher in the ABS condition compared to both the RX and RCT conditions. These findings, in part, support those previously reported in Study 2 and by Brown et al., (2001) and indicate that instructions for absorption facilitate suggested responding, over and above that produced by the hypnotic context alone.

6.4.2. Effect of hypnotic suggestibility on responses to pain modulation suggestions

Responses to pain modulation suggestions for each pain rating at SA_1 (non-hypnotic context) were significantly greater for high hypnotically suggestible participants (HHSp) in comparison to medium hypnotically suggestible participants (MHSp) and low hypnotically suggestible participants (LHSp). This is consistent with the plethora of data that indicates

that HHSp are significantly more responsive to suggestions than LHSp (e.g. Hilgard, 1965; Hilgard & Hilgard, 1994; Montgomery et al., 2000). In addition, MHSp were significantly more responsive to pain increase suggestions than LHSp at SA_1. Research regarding pain modulation suggestions in non-hypnotic contexts (i.e. not following a hypnotic induction or in a situation that is labeled hypnosis) is somewhat lacking, but these findings are consistent with the view that responding to suggestions, which have been typically associated with hypnosis, is a normal human propensity (Kirsch & Braffman, 2001). HHSp appear to be more responsive than MHSp and LHSp, irrespective of whether hypnosis is induced or not. This is consistent with the notion that hypnotic suggestibility scales, such as the HGSHS:A (Shor & Orne, 1962), are at best only scales of suggestibility – the capacity to respond to suggestions – with the addition of a hypnotic induction (Kirsch, 1997; Weitzenhoffer, 2002).

Responses to suggestions for pain decrease (↓INT & ↓UNP ratings) significantly increased (from SA_1 to SA_2) for HHSp. However, increases in responses to pain modulation suggestions following the induction of hypnosis for MHSp, was more than comparable to that of HHSp. In fact, responsiveness to pain modulation suggestions for *each* pain rating, including suggestions for pain increase, significantly increased (from SA_1 to SA_2) for MHSp. It was predicted that HHSp would show a greater increase in responses to pain modulation suggestions following a hypnotic induction, compared to LHSp and MHSp. Indeed, increases in responsiveness to pain modulation suggestions for each pain rating were significantly greater for HHSp compared to LHSp. Equally, increases in responses to pain modulation suggestions for MHSp were also found to be significantly greater than that of LHSp. There were no significant differences in increases in responses to suggested pain modulation between HHSp and MHSp. However, inspection of effect sizes indicates that the induction of hypnosis had a greater effect on suggested responding for MHSp (effect

sizes[15] ranging from: 0.68 to 1.46) in comparison to HHSp (effect sizes ranging from: 0.05 to 0.44).

These findings indicate that HHSp individuals are very responsive to both non-hypnotic suggestions and hypnotic suggestions, and paradoxically are not affected much by hypnosis per se[16]. In contrast MHSp show relatively lower levels of responsiveness to non-hypnotic suggestions, and a significantly higher level of response to the same suggestions administered during hypnosis. In some ways, MHSp could be identified as the true 'high hypnotisable' individuals, at least with regard to pain modulation suggestions. MHSp appear to be the ones who show the largest gains from addition of a hypnotic induction. Nevertheless, MHSp are rarely included in experimental designs and relatively little is known about their characteristics in comparison to HHSp and LHSp (Braffman & Kirsch, 1999). This emphasises the importance for future studies to include MHSp in their designs, as well as assessing changes in suggested responding as a function of inducing hypnosis. This may prove essential in identifying individuals that would benefit from hypnotic procedures and individuals that would be better, or at least equally, served by suggestions in a non-hypnotic context.

6.4.3. Self-reported absorption, critical thought and relaxation

The current study addressed some of the recommendations made in the previous chapter, and in contrast to Study 2, absorption and critical thought were measured in both non-hypnotic and hypnotic contexts, allowing a more systematic examination of these factors. Consistent with the results reported in Study 2, the current findings indicate that self-reported absorption was associated with changes in responsiveness to pain modulation suggestions. Changes in absorption scores (i.e. scores at SA_2 – scores at SA_1) were found to

[15] Excluding participants in the Reduced Critical Thought condition

[16] A highly hypnotizable person is traditionally conceptualised as one who shows little responsiveness to non-hypnotic suggestion and a high level of response to the same suggestions administered during hypnosis

significantly predict ↑INT,↑UNP,↓INT; and ↓UNP ratings following a hypnotic induction, accounting for 4.6% - 8.2% of the variance of hypnotic behaviour. However, changes in critical thought scores were only predictive of ↓INT ratings, and changes in relaxation scores were not predictive of any measures of responses to suggested pain modulation. As touched upon in Chapter 5, the finding that self-reported critical thought was not predictive of hypnotic behaviour, and that responses to pain modulation suggestions did not increase significantly following instructions for reduced critical thought, may be due to the actual instructions used. The instructions used, instructed participants to 'avoid thinking critically', and not to 'question' or 'analyse', which may have produced a counter-intentional effect similar to the one found in suppression experiments (e.g. Wegner et al., 1987; Wenzlaff et al., 1991), and consequently increased critical thought instead of reducing it.

6.4.4. Have state changes occurred?

The findings of the present investigation are supportive, in part, of those reported in Study 2, and are consistent with the possibility that an altered psychological state characterised by being 'absorbed' plays a role in increasing suggestibility. However, for this interpretation to have any validity, there needs to be evidence that the instructions for absorption did bring about state changes that they were designed for. In Study 2, there were no differences with regard levels of absorption, critical thought and relaxation between the three experimental conditions. Possible reasons for the homogeneity of self-reported ratings across conditions in Study 2, included: (i) no non-hypnotic context measurement; (ii) the use of forced-choice scales; (iii) the use of a problematic scale to measure critical thought; (iv) reliance on long-term memory to give ratings for each suggestion (also see Chapter 5, section 5.4.3). The current study addressed these shortcomings (see Introduction, section 6.1.4).

Self-reported absorption was found to significantly increase, from SA_1 to SA_2, for all three conditions. However, these increases were significantly greater for the ABS condition in

comparison to both the RX and RCT conditions. This may account for the difference in suggestibility between the conditions. In addition, critical thought scores only significantly decreased (i.e. a reduction in critical thought) for the ABS condition. Indeed, absorption and reduced critical thought may be viewed as working synergistically and it is conceivable that they reflect different aspects of the same cognitive processes (i.e. increased absorption may subsequently lead to less critical thought), which may explain why critical thought reduced significantly for the absorption condition. Taken together, changes in levels of self-reported absorption and critical thought and that self-reported absorption significantly predicted suggestibility change, provides support for the notion that a state of absorption may facilitate suggested responding.

6.4.5. The effects of expectation

Supportive of the 'generic non-state' view is the explanation that instructions for absorption increased responsiveness to pain modulation suggestions via changes in expectancy. Hypnotic inductions including these instructions may have been more consistent with the lay view of what constitutes an appropriate hypnotic induction. Instructions for absorption may therefore have enhanced the credibility of the definition of the situation as hypnotic, and thus increased expectation and consequently suggestibility. Consistent with this explanation, are the findings that participants in the ABS condition rated the hypnotic induction they received as significantly more typical of hypnosis than those participants in the RX or RCT conditions. In addition, participants in the ABS condition felt significantly more 'hypnotised' than participants in either of the other two conditions.

However, although responsiveness to pain modulation suggestions increased significantly following instructions for absorption, instructions for relaxation alone and reduced critical thought were insufficient to produce a significant mean increase in responses to pain modulation suggestions, despite the presence of an explicit hypnotic context. This result although found in Study 2, is contrary to previous research, as simply labelling the situation

as 'hypnosis' should significantly increase suggestibility (e.g. Barber & Calverley, 1965; Kroger & Schneider, 1959) and indicates that the *plausibility* of the labelling is a crucial additional factor.

6.4.6. Conclusions

This study provides evidence that instructions for absorption increase responses to suggestions for pain modulation, over and above that produced by the hypnotic context alone. In contrast to Study 2, instructions for reduced critical thought were not found to facilitate suggestibility. This may indicate that although such instructions facilitate responding to suggestions found in hypnotic suggestibility scales, they may not be useful for the more clinically oriented suggestions for the control of pain. Therefore, the findings of the present study, which examined a wider range of potential relationships between absorption and reduced critical thought to suggestibility, are partly consistent with those reported in Chapter 2. Increased suggestibility may be related to a state of absorption or with participants' expectations. Neuroimaging is a potential avenue that future research may explore to definitively establish what underlies changes in suggestibility as a function of hypnosis. Imaging of responses to suggestions in a non-hypnotic context is an area that has been neglected. The current study is also consistent with the view that responding to 'hypnotic' suggestions may be a normal human propensity independent of hypnosis, as HHSp are more responsive to suggestions than MHSp and LHSp regardless of whether hypnosis is induced or not. More importantly, although responses for HHSp generally increase following a hypnotic induction, the current study found that MHSp are the ones who show the largest gains from addition of a hypnotic induction. This has important implications for the control and management of pain, as these findings indicate that a large percentage of people could significantly benefit from a hypnotic intervention, rather than only HHSp. Indeed knowledge about the individuals that would benefit from hypnotic procedures and factors that influence pain control, such as instructions for absorption, could in future be more directly and optimally utilised by both patients and heath care

providers, which in turn may provide an impetus to the development of improved therapeutic techniques.

This study also raised once more the possibility that one of the functions of hypnotic inductions is to provide a plausible labelling of them as 'hypnosis', and to thereby raise expectations of an increase in response to suggestions. The next study takes up this theme.

Chapter 7

Study 4: Is Hypnosis More Than a Label?*

Chapter overview

Hypnotic induction procedures are presumed by many to induce 'hypnosis' and are often reported to enhance suggestibility. Nevertheless, as discussed earlier, knowledge about the mechanisms as well as the necessity of hypnotic inductions in changing suggestibility remains poor. This empirical chapter examines the effect of labelling induction procedures as 'hypnosis' on responsiveness to suggestion and aims to systematically determine the extent to which hypnotic suggestibility is affected by: (a) the induction technique itself; and (b) the recognition or perception that a hypnotic procedure is being carried out. This has important implications for the use of hypnosis and suggestion clinically as well as practically as a cognitive tool and may indicate that the ability to respond to suggestions may be a normal characteristic, independent of hypnotic induction procedures.

7.1 Introduction

Interest in hypnosis is currently experiencing a revival, with discussions turning to the effects of the clinical efficacy of hypnosis as an adjunct to psychological and pharmacological therapies (e.g. Kirsch et al., 1995; Patterson & Jensen, 2003), its cost-saving role in health care (e.g. Lang et al., 2000; Lang & Rosen, 2002) and its potential as a tool to study cognitive phenomena (e.g. Oakley et al., 2003; Rainville et al., 1997; Szechtman et al., 1998). With the increasing use of hypnosis in clinical practice and the harnessing of hypnosis by cognitive neuroscientists as a means of illuminating mental processes, a central issue that arises for the practical application of hypnosis concerns the use of hypnotic

* This study has been published in a paper by Gandhi and Oakley (2005) under the title 'Does 'hypnosis' by any other name smell as sweet? The efficacy of 'hypnotic' inductions depends on the label 'hypnosis"

induction procedures and their efficacy. Hypnotic inductions are communications used with the intention of facilitating the elicitation of hypnotic phenomena by means of suggestion (Edmonston, 1991). However, as discussed earlier, research has yet to establish the role of induction procedures in achieving these suggested effects or the mechanisms by which they might exert their influence (Braffman & Kirsch, 1999; Kirsch & Braffman, 2001)

7.1.1. The label 'hypnosis'

One of the key elements in formal hypnotic induction procedures is the hypnotic label. There is enormous variation, however, in what constitutes a hypnotic induction. They may involve, for example, instructions to engage in visual imagery, to sit quietly, or to exercise vigorously, to remain alert or to become relaxed, as well as embedded instructions and suggestions (e.g. to become drowsy or enter a dream-like state). Nevertheless, all these hypnotic inductions are normally explicitly labelled 'hypnosis' - participants' perceptions of inductions and consequently their hypnotic responding is influenced by their lay beliefs, expectations and motivations concerning hypnosis and its effects on behaviour and experience. Woody, Bowers and Oakman (1992) note 'while an explicit hypnotic induction may be quite unnecessary for the elicitation of hypnotic phenomena, the *perception* of the situation as a hypnotic context may be crucial.' (p. 25). Supportive of this view, Barber and Calverley (1964, 1965) showed that the hypnotic label is capable of increasing responsiveness to suggestion, even in the absence of any formal induction procedures.

More recently, Lynn, Vanderhoff, Shindler & Stafford (2002) compared 132 participants' responses to the Carleton University Responsiveness to Suggestion Scale (CURSS: Spanos et al., 1983) following either: (i) a standard hypnotic induction; (ii) a standard induction, with all references to 'cooperation' removed; (iii) a standard induction which instructed individuals that an 'altered state of consciousness' or 'trance' was needed to experience hypnosis; or (iv) no induction, with the session being defined as hypnosis. There were no significant statistical differences between the 'no-induction' group and any of the other

three groups in terms of behavioural and subjective responding and Lynn et al., (2002) concluded that 'hypnotic inductions are no more effective than suggestions alone elicited in a hypnotic context' (p. 239)

7.1.2. Hypnotic inductions as 'non-deceptive' placebos

Kirsch (2000b) has described hypnotic inductions as 'non-deceptive placebos'. He writes 'when the effect of administering a drug is found to be independent of its specific ingredients, the drug is deemed to be a placebo. Similarly, hypnotic inductions must be expectancy manipulations, akin to placebos, because their effects on suggestibility are independent of any specific component or ingredient' (p. 237). Support for the notion that the effects of hypnotic inductions on suggestibility are independent of any specific component has been provided by studies that have demonstrated that virtually anything labelled as hypnosis can produce so-called 'hypnotic' effects. Glass and Barber (1961) used a placebo 'hypnotic drug' to induce hypnosis. Glass and Barber (1961) established a medical context by introducing participants to a physician who undertook a variety of measurements (blood pressure, reflex patterns, pupillary changes) and explained that the 'powerful hypnotic drug' would increase suggestibility quickly by acting upon 'neurological centres'. Within this context, participants were given a tablet and a half of sodium bicarbonate, and subsequently received 8 standardised test suggestions. The results indicated that the 'hypnotic drug' was as effective in enhancing suggestibility as a formal 20-minute trance induction; with mean behavioural responses of 5.8 and 6.3 respectively not differing significantly. Baker and Kirsch (1993) similarly used a 'hypnotic drug' placebo in a study investigating hypnotic analgesia. They initially reported that a traditional trance induction produced more pain relief in response to suggestions than a pain-reducing analgesic placebo. However, when the placebo was described as a 'hypnotic drug' that increased suggestibility, the effects of hypnotic and placebo ('hypnotic drug') pain reduction were equivalent.

Kroger and Schneider (1959) reported on tests designed to induce hypnosis by 'subliminal and photic stimulation of the brain waves' (p. 93). Kroger and Schneider used an apparatus called the 'brain-wave synchroniser' which they claimed would increase efficiency in the induction of hypnosis and asserted that when stroboscopic flash light frequency was set at or close to participants' 'dominant alpha rhythm', photic driving would occur and induce hypnosis. However, as later demonstrated by Hammer and Arkins (1964), the 'brain-wave synchroniser' was nothing more than a 'placebo' procedure. The synchroniser on its own had no effect on hypnotic suggestibility, and only affected hypnotic suggestibility when participants were informed that it would induce hypnosis. Although unintentional, Kroger and Schneider's study was an early demonstration of the use of an expectancy modification procedure as a hypnotic induction.

In a conceptually similar study, Council, Kirsch, Vickery and Carlson (1983) used the setting of a psychophysiological laboratory to lend credibility to a placebo induction involving 'bio-feedback'. Participants were informed that hypnosis could be induced through amplification of particular brainwaves. They then viewed their 'brainwaves' on an oscilloscope, whilst receiving false feedback. This expectancy modification procedure was equivalent to traditional trance induction procedures on most measures of responsiveness to suggestion.

There is a considerable body of evidence demonstrating that the expectations, perceptions and pre-conceptions individuals have about hypnosis are important determinants of hypnotic behaviour (see Chapter 2, section 2.2.1, for a fuller account). A notable example of this was reported by Orne (1959), who showed, that by varying participants' expectations about what will happen during hypnosis, different out comes would subsequently occur. In Orne's study, half of the participants were informed that a key characteristic of hypnosis was arm catalepsy; the other half was not given any specific expectancy altering information. Orne found that significantly more of the former group displayed arm catalepsy compared to the latter. Similarly, Lynn, Snodgrass, Rhue and Hardaway (1987) found participants'

subjective experience and involuntariness ratings to be significantly correlated with their pre-hypnotic beliefs about hypnosis.

There is strong evidence to suggest that non-hypnotic or 'neutral' procedures labelled as 'hypnosis' are as effective as a formal hypnotic induction in increasing suggestibility. However, a question that has yet to be addressed is whether hypnotic inductions themselves continue to be as effective when not labelled 'hypnosis'. To the author's knowledge, the effect of a standardised hypnotic induction, independent of the label 'hypnosis' has not been previously examined. Given that hypnotic inductions seem likely to be increasingly used clinically and experimentally, it is essential to determine the degree to which the effect of hypnotic inductions is a function of the technique itself or due to the label 'hypnosis'.

7.1.3. Study objectives

The current study aimed to systematically investigate the effect that a hypnotic induction has on responsiveness to suggestion and to determine the extent to which the magnitude of this effect is altered by labelling the procedure 'hypnosis'. As in Study 2, participants were initially presented with a suggestibility measure in the absence of any formal instructions or mention of hypnosis. They were then presented with the suggestibility measure for a second time following either a hypnotic induction which was explicitly labelled as relaxation (RX condition); a hypnotic induction which was explicitly labelled as hypnosis (HYP condition); or, as a control condition, an extract from a psychology text book (CON condition). Behavioural, subjective and experienced involuntariness measures of responsiveness to suggestion were obtained. Naivety concerning hypnosis was maintained throughout the study for participants in all three groups with the sole exception that the word 'hypnosis' was used when introducing the induction procedures to those in the HYP condition. Importantly, the set of expectations for those participants involved in the 'hypnotic' procedure labelled hypnosis (HYP condition) were different to those involved in the 'hypnotic' procedure labelled relaxation (RX condition).

7.2 Method

7.2.1. Design

For the reasons outlined in Chapter 5 (section 5.2.1.), a 3 x 2 (condition x context) between-within design was employed, with induction condition as the three level independent variable (CON vs. HYP vs. RX). Changes in behavioural, subjective and experienced involuntariness suggestibility scores from the first suggestibility assessment (SA_1) to the second (SA_2) were the principle dependent variables. It is important to note that the results from Study 2, as well as the findings of previous studies (Barber & Glass, 1962; Braffman & Kirsch, 1999; Hilgard & Tart, 1966; Weitzenhoffer & Sjoberg, 1961) provide no evidence for: (1) a disproportionate number of high, medium and low hypnotically suggestible individuals in experimental and control groups, and (2) ceiling effects for very responsive individuals.

7.2.2. Measures

7.2.2.1. Suggestibility scale

Suggestibility was measured on the Waterloo-Stanford Group Scale of Hypnotic Susceptibility Form C: (WSGC; Bowers 1993, 1998; Kirsch, Milling & Burgess, 1998). The WSGC is a group adaptation of the individually administered Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962). The WSGC consists of twelve test suggestions, however, four test suggestions were deemed unsuitable for repeated presentation (age regression; negative visual hallucination; posthypnotic suggestion; amnesia), and consequently were not used in this study. The adapted WSGC consisted of eight suggestions in total and included two ideomotor suggestions (hand lowering; moving hands together), two challenge suggestions (arm rigidity; arm immobilization), and four cognitive suggestions (dream, mosquito hallucination; music hallucination; taste hallucination).

Two versions of the scale were created, with the same items in different testing orders, which were counterbalanced and presented across the conditions. However, the relative order of ideomotor, challenge and cognitive suggestions was always maintained across the two tests. The scale was used to measure suggestibility before the induction manipulation (SA_1) and after the induction manipulation (SA_2).

The scoring of suggestibility items was adapted from the WSGC, assessing both behavioural (Bowers, 1998) and subjective measures (Kirsch et al., 1998). Internal reliability of the behavioural and subjective scales has been reported as 0.81 and 0.89 respectively, indicating high internal consistency (Bowers, 1993; Kirsch et al., 1998). Self-reported behavioural scores on the WSGC are obtained by having participants complete a questionnaire on which they indicate whether they had made the behavioural response called for by the suggestion (0 = *no;* 1= *yes*). Behavioural responses to suggestions were assessed as the sum of these ratings (range 0-8). Subjective scores on the WSGC are obtained by having participants rate the degree to which they felt the subjective effects called for by each suggestion (e.g. arm lowering, arm rigidity) on a 5-point Likert scale (1 = *not at all*; 5 = *to a great degree*). Subjective experience responsiveness to suggestion were assessed as the sum of these ratings (range 8-40)

Existing scales, with the exception of one (the Carleton University Responsiveness to Suggestion Scale: CURSS: Spanos et al., 1983) do not measure whether responses to suggestions are experienced as involuntary or not, i.e. the 'classic suggestion effect' (Weitzenhoffer, 1953). Consequently, in addition to the behavioural and subjective scores of the WSGC, self-reported experienced involuntariness was assessed. The scoring of experienced involuntariness was adapted from the CURSS. Experienced involuntariness scores were obtained by having participants rate the degree to which their response to each suggestion was experienced as being involuntary (0 = *not at all*; 4 = *great degree*). In line with the CURSS, participants were only scored as experiencing involuntariness, for each suggestion, if the classic combination of behavioural occurrence and non-volitional

experiencing occurred. Therefore, a score of 1 was given, if the behavioural indicator occurred and involuntariness was either rated moderate or rated high. Otherwise a score of 0 was given. Overall, experienced involuntariness of responding to suggestion was assessed as the sum of these ratings (range 0-8).

7.2.3. 'Hypnotic' inductions

The hypnotic induction procedure administered was adapted from the one accompanying the WSGC, with the 20 mentions of 'hypnosis' and 'hypnotised' being changed to the words 'absorption' or 'absorbed' (adapted induction procedure presented in Appendix 7.1). This was done to maintain naivety concerning the nature of the experiment, as well as to retain the authenticity and nature of the induction, without using the words hypnosis. The words 'absorption/absorbed' were used on the strength of Studies 2 and 3, and as the construct of absorption (Tellegen & Atkinson, 1974) is often cited as an important feature of hypnosis, and is widespread within the field. At one time it represented probably the most significant point of convergence between theories of hypnosis (Spanos & Barber, 1974). Participants in the HYP condition and RX condition received identical hypnotic inductions, with the only difference being that the hypnotic induction was either labelled 'hypnosis' or 'relaxation'.

For participants in the HYP condition, the re-worded 'hypnotic' induction was preceded by the following instructions, adapted from the instructions used by Braffman & Kirsch (1999):

> 'In this second part of the study, we want to assess your ability to experience the same suggestions, only this time we will ask you to experience them *whilst in hypnosis.* So in this version, the suggestions will be preceded by a *hypnotic induction* to help you become *hypnotised.*'

For participants in the RX condition, the same 'hypnotic' induction was preceded by the following instructions:

> 'In this second part of the study, we want to assess your ability to experience the same suggestions, only this time we will ask you to experience them *whilst being relaxed.* So in this version, the suggestions will be preceded by *relaxation instructions* to help you become *relaxed.*'

Participants in the CON condition did not receive a 'hypnotic' induction. Instead, they received an extract on the capacities of the newborn infant from 'Hilgard's Introduction to Psychology' (Atkinson, Atkinson, Smith, Bem, Nolen-Hocksema, 2000, p. 73-76). The book extract was preceded by the following instructions:

> 'In this second part of the study, we want to assess your ability to experience the same suggestions. Before the second part of the study begins, we would like you to concentrate and listen to the words of an extract from a book.'

7.2.4. Participants

In all 105 participants (58 males & 47 females) took part in this study. All participants were undergraduate university students, with the majority being recruited from University College London. The age of participants ranged from 18-37 years, with a mean age of 22.41 years (SD = 3.82). All signed up for an experiment entitled, 'the influence of state and context on behaviour', and participated in one of the following three conditions: CON (N=35, 21 male, 14 female); HYP (N=35, 19 male, 16 female) or RX (N=32, 18 male, 17 female). Participants were randomly allocated to conditions on the day of assessment, and were tested in small groups of 2-5 participants. Psychology students were excluded from this study due to their experience with hypnotic procedures during their course and familiarity with the investigators. The joint UCL/UCLH Committee on the Ethics of Human Research approved this study; informed consent was obtained from all participants.

7.2.5. Procedure

After reading the study information sheet and providing consent, all participants were presented with SA_1. Participants were informed that it was a measure of imagination (see Barber, 1965; Braffman & Kirsch, 1999). After scoring SA_1, participants received a hypnotic induction that was either labelled as 'hypnosis' (HYP) or 'relaxation' (RX) or no hypnotic induction at all (CON), depending on which experimental condition they had been assigned to. SA_2 was then presented and behavioural, subjective and experienced involuntariness measures of responsiveness to suggestion were scored. Finally, when all measures had been completed, participants were asked to respond to a set of questions that asked what they thought the experiment was about: *i) before they arrived at the testing session; ii) after the first set of suggestions;* and *iii) after the second set of suggestions.* These questions were asked to assess participants' awareness of hypnosis or hypnotic-like procedures. All assessments and instructions were recorded on audiotape for maximum experimental control.

7.2.6. Statistical analyses

SPSS for Mac OS X (version 10.1) was used for the analyses of data. The effect of condition on suggestibility (behavioural, subjective, involuntariness) was tested using a 3 x 2 (condition x context) between-within analyses of covariance (ANCOVA), taking suggestibility scores at SA_1 as the covariate. Comparison of the means were carried out by Fisher's protected least significant difference (LSD) test (Carmer & Swanson, 1973; Howell, 1997). Paired-samples Student's t-tests were carried out to compare suggestibility scores for the first suggestibility assessment (SA_1) with suggestibility scores for the second suggestibility assessment (SA_2). A rejection region with at least a value of $p < 0.05$ was selected and used throughout (Tabachnick and Fidell, 2001)

7.3. Results

No participants from any of the three experimental conditions reported that the experiment may have been or was related to hypnosis after the first set of suggestions had been administered (SA_1). Naivety concerning the experiment involving 'hypnosis' and 'hypnotic procedures' was maintained throughout the study for the majority of participants in the RX and CON groups. Five participants from the RX group and three participants from the CON group reported that the experiment *might have* involved hypnosis after the second set of suggestions had been administered (SA_2). Means and correlations were calculated for both the full sample and sub-sample of participants who reported no awareness or suspicion that the study concerned hypnosis. The patterns of means and correlations were virtually identical for the two data sets, so only analyses of the full sample are reported here.

Means and standard deviations of responses to suggestion, for each condition, are presented in Table 7.1 and Figure 7.1. As an important part of the analyses, quantification of the effect of condition on responsiveness to suggestions was calculated (see Table 7.1). The data were screened for univariate and multivariate outliers. No cases were found to have standardised scores in excess of ± 3.29 ($p< 0.001$, two-tailed test). The data were normally distributed, with no skewness and kurtosis values exceeding standardised scores of ± 3.29 ($p< 0.001$, two-tailed test). Mahalanobis distances (critical values, $\chi^2_{(6)} = 22.458$, $p <0.001$) were calculated. No cases were found to have Mahalanobis distances greater that the critical value demonstrating the absence of multivariate outliers.

Correlations between responses to suggestions for the first suggestibility assessment (SA_1) and the second suggestibility assessment (SA_2) were significant for all measures in each condition: behavioural (CON: $r = 0.686$, $p < 0.001$; HYP: $r = 0.470$, $p < 0.01$; RX: $r = 0.577$, $p < 0.001$); subjective (CON: $r = 0.767$, $p < 0.001$; HYP: $r = 0.497$, $p < 0.01$; RX: $r = 0.663$, $p < 0.001$); experienced involuntariness (CON: $r = 0.811$, $p < 0.001$; HYP: $r = 0.717$, $p < 0.001$; RX: $r = 0.722$, $p < 0.001$). Condition was found not to moderate the association

between SA_1 and SA_2 scores (Fisher's transformation, 1921). The r between SA_1 and SA_2 scores for each measure of suggestibility (behavioural, subjective, involuntariness) did not significantly differ between: (i) CON and HYP conditions; (ii) CON and RX conditions; and (iii) RX and HYP conditions.

Concerning behavioural responses, 13 participants (37%) in the CON condition passed fewer suggestions following an extract from a psychology textbook; 10 (29%) showed no change at all, and 12 (34%) exhibited greater suggestibility. Nine participants (26%) in the HYP condition showed a decrease in behavioural scores, with 5 participants (14%) showing no change, and 21 (60%) showing greater behavioural responses following a hypnotic induction that was explicitly labelled as hypnosis. Thirteen participants (37%) in the RX condition reported reduced behavioural responses, whilst 9 (26%) reported no change, and 13 (37%) reported greater behavioural responses following a hypnotic induction that was explicitly labelled as relaxation. The frequency distributions of changes in behavioural, subjective and involuntariness measures of responsiveness to suggestion for each condition are displayed in Table 7.2.

The ANCOVA for behavioural scores indicated a significant main effect for Condition [$F_{(2,101)} = 3.944$, $p < 0.025$]. This effect revealed that change in behavioural suggestibility scores in the HYP condition was significantly different to that observed in the CON condition [LSD test, $p < 0.01$]. The difference between: (i) the RX and CON conditions and (ii) the HYP and RX conditions, on behavioural suggestibility change were non-significant. There were no significant differences in behavioural scores at SA_1. Paired samples t-tests indicated that behavioural scores significantly increased from SA_1 to SA_2, for only the HYP condition [$t_{(34)} = 2.894$, $p < 0.01$]. No significant differences in behavioural scores from SA_1 to SA_2, were found for either the RX or CON conditions.

Table 7.1. Mean (standard deviation) responses to suggestions for the first suggestibility assessment (SA_1) and the second suggestibility assessment (SA_2).

	Behavioural			Subjective			Involuntariness		
	SA_1	SA_2	Effect Size (*d*)	SA_1	SA_2	Effect Size (*d*)	SA_1	SA_2	Effect Size (*d*)
CON	3.17 (1.40)	3.09 (1.76)	-0.05	19.34 (4.82)	18.94 (4.94)	-0.08	2.20 (1.41)	2.11 (1.47)	-0.06
HYP	3.14 (1.93)	4.06 (1.68)	0.51	19.46 (4.47)	25.80 (6.16)	1.18	2.11 (1.43)	3.71 (1.84)	0.97
RX	3.69 (1.83)	4.00 (1.93)	0.16	21.11 (5.48)	22.66 (5.77)	0.28	2.77 (1.66)	3.17 (1.99)	0.22

Note.

Behavioural scores are ratings of behavioural responses to suggestions & are defined as the number of suggestions passed out of eight. *Subjective scores* are ratings of degree to which participants felt the subjective effects called in each suggestion & were rated out of forty (i.e. measured on a scale of 1-5 for each of the eight suggestions). *Involuntariness scores* are ratings of experienced involuntariness of suggestions & defined as the number of suggestions passed out of eight

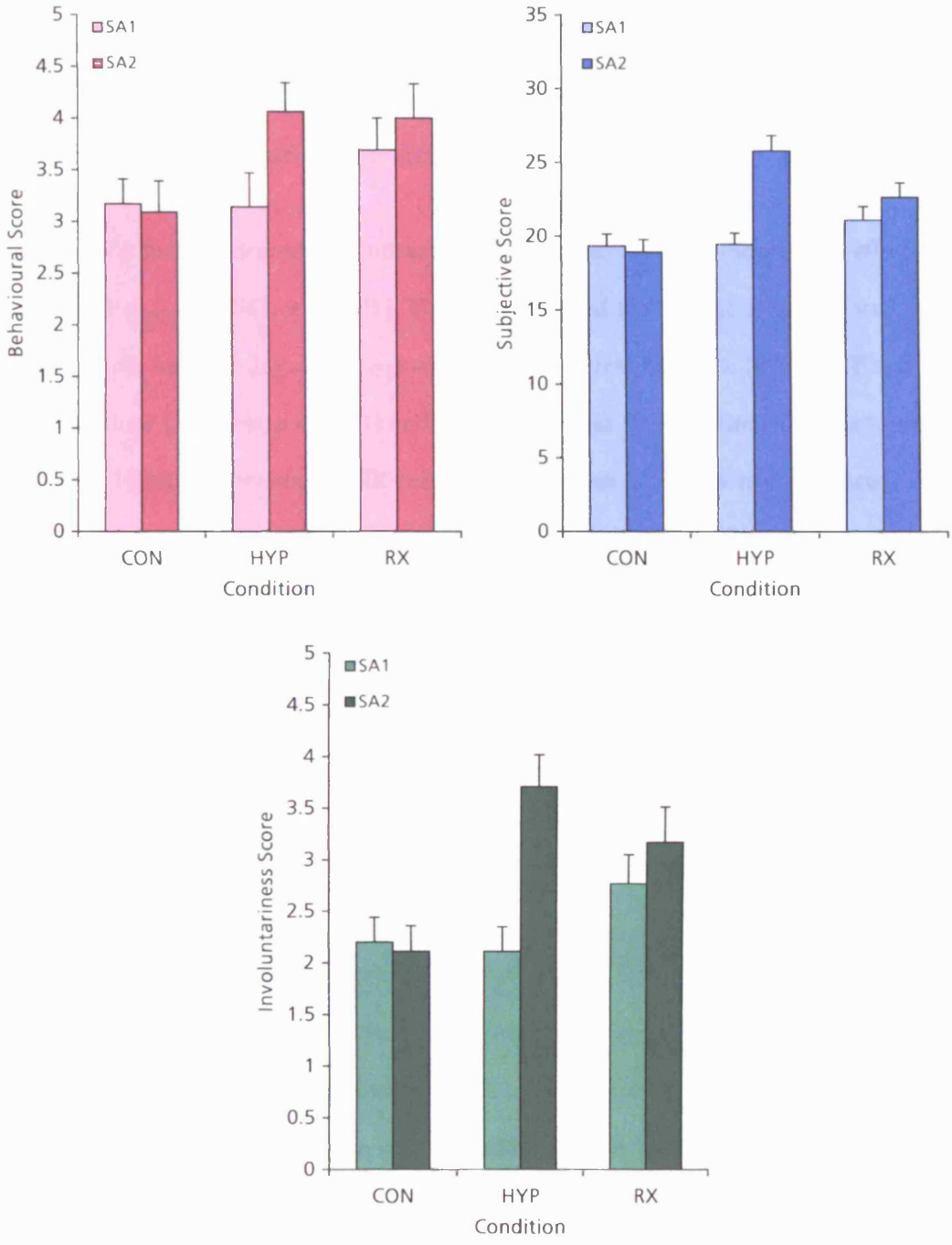
Table 7.2. Frequency distribution (percentages) of changes in behavioural, subjective and experienced involuntariness measures of suggestibility as a function of an extract from a textbook (CON), a hypnotic induction labelled as 'hypnosis' (HYP) and a hypnotic induction labelled as 'relaxation' (RX)

	Behavioural			Subjective			Involuntariness		
	Decrease	Same	Increase	Decrease	Same	Increase	Decrease	Same	Increase
CON	13 (37%)	10 (29%)	12 (34%)	13 (37%)	8 (23%)	14 (40%)	10 (29%)	17 (48%)	8 (23%)
HYP	9 (26%)	5 (14%)	21 (60%)	7 (20%)	0 (0%)	28 (80%)	1 (3%)	7 (20%)	27 (77%)
RX	13 (37%)	9 (26%)	13 (37%)	13 (37%)	0 (0%)	22 (63%)	10 (29%)	7 (20%)	18 (51%)

Note.

A decrease was when participants' responses to suggestion were lower at SA_2 (after an induction) when compared to their responses at SA_1 (prior to an induction). Same refers to when participants' responses to suggestions were the same at both SA_1 and SA_2. An increase was when participants' responses to suggestion were higher at SA_2 when compared to their responses at SA_1

Figure 7.1. Mean (standard error) behavioural, subjective and involuntariness scores for the control (CON), 'hypnosis' (HYP) and 'relaxation' (RX) conditions



As with behavioural scores, the ANCOVA for subjective scores indicated a significant main effect for Condition [$F_{(2,101)} = 21.306$, $p < 0.001$]. This effect revealed that change in subjective suggestibility scores was significantly different between: (i) the HYP and CON conditions [LSD test, $p < 0.001$]; (ii) the HYP and RX conditions [LSD test, $p < 0.001$]; and

(iii) the RX and CON conditions [LSD test, $p < 0.025$]. There were no significant differences in subjective scores at SA_1. Paired-samples Student's t-test indicated, again as with behavioural scores, revealed a significant increase in subjective scores from SA_1 to SA_2, for only the HYP condition [$t_{(34)} = 6.785$, $p < 0.001$]. No significant differences in subjective scores from SA_1 to SA_2, were found for either the RX or CON conditions.

The ANCOVA for experienced involuntariness scores indicated a significant main effect for Condition [$F_{(2,101)} = 17.561$, $p < 0.001$]. This effect revealed that change in experienced involuntariness suggestibility scores was significantly different between: (i) the HYP and CON conditions [LSD test, $p < 0.001$] and (ii) the HYP and RX conditions [LSD test, $p < 0.001$]. The difference between the RX and CON conditions on change in experienced involuntariness scores was non-significant. There were no significant differences in experienced involuntariness scores at SA_1. Paired samples t-tests indicated a significant increase in experienced involuntariness scores from SA_1 to SA_2, for the HYP condition [$t_{(34)} = 7.349$, $p < 0.001$]. No significant difference in experienced involuntariness scores from $SA_1$to SA_2, were found for either the RX or CON conditions.

7.4. Discussion

The purpose of this study was to assess the effect a hypnotic induction has on responsiveness to suggestion and determine the extent to which 'hypnotic' responsiveness to suggestions is affected by the induction procedure itself and the effect of labelling the procedure 'hypnosis'. As in previous studies (Barber & Glass, 1962; Braffman & Kirsch, 1999; Brown et al., 2001; Hilgard & Tart, 1966; Hull, 1933; Weitzenhoffer & Sjoberg, 1961), the results of this investigation appear to indicate that a hypnotic induction increases suggestibility by a relatively small amount. However, this effect was moderated by whether the induction was labelled 'hypnosis' or 'relaxation'. Neither behavioural, subjective, nor involuntariness measures of responsiveness to suggestion significantly increased following the use of a hypnotic induction that was labelled as 'relaxation' (RX condition); on average

50% of participants in this condition experienced a decrease or no change in suggestibility. In contrast behavioural, subjective and involuntariness measures of responsiveness to suggestion, increased significantly following the use of the same hypnotic induction that was labelled as 'hypnosis' (HYP condition); on average 72% of participants in this condition exhibited greater responses to suggestions. Moreover, the significant increases in subjective and experienced involuntariness measures of suggestibility following a hypnotic induction labelled 'hypnosis' were over and above that produced by the same hypnotic procedure labelled 'relaxation'. These results indicate that the significant effect hypnotic inductions have on suggestibility is dependent on the label 'hypnosis'.

The current findings challenge the traditional view of hypnotic responsiveness as primarily an altered state of consciousness, which is often presumed to be determined by the administration of a hypnotic induction. The findings indicate that whilst the technique of a hypnotic induction itself has little effect on responsiveness to suggestion, the recognition or perception that a hypnotic induction is being carried out appears to be the significant factor. This is supportive of the 'generic non-state' view, which defines hypnosis as a social context established by a set of culturally defined procedures termed as hypnotic inductions or procedures, and that 'hypnotic' phenomena can be explained by expectancy, motivation and beliefs (Barber, 1969; Kihlstrom, 1985; Kirsch, 2000a; Sarbin & Coe 1972). It is worth noting here the possibility that these non-state factors may themselves generate a correspondingly distinctive mental state. However, this is of course a different proposition from the 'generic altered state' view in its 'strong'[17] version (see Chapter 2, section 2.1.1, for accounts of the 'generic non-state' and 'generic altered state' conceptions of hypnosis)

[17] The 'strong' interpretation of the state is the traditional understanding of hypnosis, as a special or distinct state of consciousness characterised by cognitive, behavioural, phenomenological, and physiological processes that all hypnotised individuals enter. In contrast the 'weak' interpretation views the hypnotic state as a descriptive label representing a domain of characteristic phenomena, including suggested behaviours and self-reports of experience. The 'weak' interpretation construes the 'state' as a shorthand for this description, with no causal properties or defining features associated with it (Hilgard, 1969; Kihlstrom, 1985).

The generalisability of interpreting results from studies involving hypnotic induction procedures is not without question. Although most studies use a so-called 'traditional' hetero-induction, which involves mental and physical relaxation, there is enormous variation in procedures that are termed 'hypnotic inductions'. For example, a hypnotic induction, may involve suggested visual imagery, various ideomotor suggestions (e.g. non-volitional eye closure), instructions to remain alert, instructions to relive experiences and embedded suggestions. The findings of the present study in addition to those of studies 2 and 3 indicate that the following components are instrumental: (i) the definition of the situation as 'hypnosis'; (ii) instructions to become mentally involved or to focus on internal experiences (absorption); and (iii) instructions to avoid thinking critically producing a reduction in monitoring, judging and interpreting (reduced critical thought). However, it remains unclear which *other* components of hypnotic inductions procedures are necessary and which are redundant. Future research will need to address this issue through several well-designed studies, using different hypnotic induction procedures. As noted by Oakley and Halligan (2005), this also raises a practical concern for studies involving hypnotic induction procedures, as it becomes essential to describe these procedures in detail, which is not consistently done in experimental or clinical studies.

7.4.1. The effect of the label 'hypnosis'

As discussed in Chapter 3, although previous research characterises the increase in suggestibility produced by hypnotic inductions as being small, but significant, this is not a true reflection of the efficacy of hypnotic inductions, as the size of the experimental effect has not been considered. Effect sizes allow us to calculate the relative magnitude of an experimental treatment (Rosnow & Rosenthal, 1996). The mean effect sizes of labelling a hypnotic induction 'hypnosis' on suggestibility varied from 0.51 (behavioural) to 1.18 (experienced involuntariness). If we consider that the mean effect size for psychological treatments in general is 0.47 and the mean effect size of medical outcomes (other than mortality) ranges from 0.24 to 0.80 (Lipsey & Wilson, 1993), the effect of adding an

induction that is perceived to be hypnosis (i.e. labelled hypnosis) is substantial and on some measures very substantial indeed.

These results are supportive of the substantial data on the clinical efficacy of hypnosis as an adjunct to psychological and pharmacological therapies, which has been shown for many different conditions, including those which can be functional or psychosomatic in origin, or at least exacerbated by anxiety, stress or psychological factors (see Kirsch et al., 1995).

7.4.2. Conclusions

It is evident that hypnotic induction procedures in themselves are not rituals by which suggested hypnotic phenomena are established. The hypnotic induction as a technique produced a modest increase in responses to suggestions. However, the increase was only significant if the induction procedure was labelled 'hypnosis'. This constitutes a challenge to the 'generic altered state' view as well as the 'strong' version of the altered state hypothesis and indicates that the production of suggested hypnotic phenomena is not dependent on a hypnotic technique per se. The significant element of such procedures appears to be the label 'hypnosis' or the suggestion of 'hypnosis'. In a sense the label 'hypnosis' can be interpreted as a 'meta-suggestion' that subsequent suggestions will be responded to more strongly. The results may reassure both clinicians and researchers that they do not need to rely on elaborate inductions to produce suggested experiences (e.g. hallucinations, amnesia, analgesia). Nevertheless, the mean effect size of the label 'hypnosis' on suggestibility indicates that if the label can be reasonably and plausibly applied to an appropriate clinical or experimental procedure, then it should be used. Between 60-80% of participants in the present study experienced an increase in suggestibility following an induction labelled as 'hypnosis'[18] – 'the effect is there ...and it would seem sensible to utilise the idea when defining hypnosis' (Wagstaff, 1998a, pg. 160). The label hypnosis is important because it maximises the occurrence of suggested changes, experiences and behaviour. These data

[18] Presumably, the minority of participants that showed no difference or a reduction in suggestibility may benefit from more 'suggestive' approaches without the use of a hypnotic induction.

again highlight the important issue of suggestion and hypnosis. As has been discussed, it is important that hypnosis and suggestion are treated separately, until the cognitive and neuropsychological mechanisms of both have been definitively established, as it is still unknown whether suggested effects that occur outside hypnosis are represented differently in the brain than those occur following a hypnotic induction. The findings indicate that responding to suggestions, which have been typically associated with hypnosis, is a normal human propensity and therefore may shed considerable light on the mundane building blocks of everyday psychoneurological processes, dysfunctional experience and behaviour, as well as consciousness and self-awareness (Kirsch & Braffman, 2001; Oakley & Halligan, 2005).

Labelling a 'hypnotic' procedure 'hypnosis' thus seems to be an effective way of increasing subsequent responses to suggestion and this labelling is a common, albeit often unintentional, pre-induction strategy. Another component of pre-induction routines is the elicitation of compliance with a number of requests (e.g. to sit in a particular way; to look at a particular object). Some indirect hypnotic procedures explicitly develop an expectancy of positive responding to instructions and ideas (the so-called 'yes set'; Erickson, Rossi & Rossi, 1976) as a facilitator of hypnotic responsiveness. The next chapter investigates this strategy, hitherto neglected experimentally, as a potential variable in increasing responsiveness to 'hypnotic' suggestions.

Chapter 8

Study 5: When Responses to Requests Affect Responses to Suggestion

Chapter overview

Suggestions are rarely given in an isolated form and are often administered accompanied by several instructions or requests (e.g. requests to use imagery or carry out certain procedures). Hypnotic techniques used by researchers and clinicians to alter experiences, thoughts and behaviours are often therefore complex communications comprised of suggestions and requests. The basic difference between requests and suggestions is that a request implies that the response should be performed intentionally, whereas a suggestion implies that the response will happen by itself. Some 'indirect' approaches to hypnosis have employed repeated instructions and questions that promote affirmative responses to create a compliant state of mind (the 'yes set', Erickson et al., 1976) to facilitate responses to suggestion. Given the common practice of making requests before and during the administering of suggestions, this chapter examines systematically, how behaviour performed in response to requests influences responses to suggestion.

8.1. Introduction

Typically, hypnotic induction procedures begin by requesting certain activities (e.g. closing your eyes and relaxation) and then progressively shift to suggest the same responses (e.g. 'your body is very relaxed'). Making requests before and in the midst of administering suggestions is common. For example, participants are usually *requested* to prepare or position themselves in a certain way prior to a suggestion (e.g. position their hands in a certain way or adopt a certain scenario) and are often *requested* to terminate a suggestion

and anticipate the next suggestion (Gorassini, 2002). Experimental situations themselves are also strongly associated with requests; individuals are frequently requested to participate, to give consent and for personal information (Haley, 1958). Although there is a large body of social psychological literature that indicates that compliance to a request on one occasion enhances compliance on subsequent occasions (e.g. 'foot-in-the-door' tactic[19]: DeJong, 1979; Freedman & Fraser, 1966; 'door-in-the face' tactic[20]: Cialdini, 2001; Cialidini, Vincent, Lewis, Catalan, Wheeler & Darby, 1975), knowledge regarding the influence of compliance with a prior request on responsiveness to a suggestion is an area that has received little explicit recognition.

8.1.1. Suggestions vs. requests

The difference between requests and suggestions lies in their representation of behavioural causation (Gorassini, 1997, 2002; Hilgard, 1965; Spanos & Gorassini, 1984; Weitzenhoffer, 1974; 2000). A request implies that the response should be performed intentionally and defines the self as the cause of the response (e.g. 'lower you arm'). In contrast, a suggestion implies that the response will happen by itself and attributes the cause to a source external to the self (e.g. 'your arm is getting heavier and heavier and beginning to lower'). A request calls for a voluntary act; a suggestion for an involuntary response.

Gorassini (1997, 2002, 2004) identifies another key difference between requests and suggestions, in what he calls '*reversibility*: the property that allows a message to be construed in two qualitatively difference ways, in this case with respect to the actions required of the participant' (Gorassini, 2002, p.172). According to Gorassini, requests are usually interpreted only in one way, in that the recipient of a request will almost always be expected to make the requested response (e.g. raising a hand in response to the request 'raise your

[19] Request technique to gain compliance, in which the focal request is preceded by a smaller request that is bound to be accepted

[20] Request technique to gain compliance, in which the focal request is preceded by a larger request that is bound to be refused

hand'). Suggestions, on the other hand, are open to two contrasting interpretations. One construal is that the recipient of a suggestion refrains from making the suggested response and waits for the suggested response to occur by other means. The other interpretation is that the recipient of a suggestion makes the suggested response in a more general attempt to experience the suggestion. For example, making an arm go down whilst experiencing the suggested notion that it is getting heavier and happening by itself.

Consistent with these conceptualisations are studies that indicate that requests of a reasonable nature elicit unanimous voluntary responses, whereas suggestions of a reasonable nature bring about involuntary responses in a relatively small proportion of individuals (e.g. Gorassini, 2002; Spanos & Barber, 1972; Spanos & Gorassini, 1984; Weitzenhoffer, 1974). For example, in a study by Spanos and Gorassini (1984), participants were administered three suggestions and three requests in a counterbalanced order. The requests instructed participants to make a series of motor responses while the suggestions implied that the same responses occurred involuntarily. Results indicated that participants displayed a greater behavioural response to requests but rated their responses to suggestions as more involuntary than responses to requests. Similarly, Spanos and Barber (1972) and Weitzenhoffer (1974) found that responses to suggestions tended to be rated as more involuntary than those made to a request.

8.1.2. Is a request always a request?

Although requests are usually voluntary responses, there is evidence indicating that some participants may rate their responses to requests as occurring at least moderately involuntarily, in both hypnotic (Weitzenhoffer, 1974; Spanos & Barber, 1972) and non-hypnotic contexts (Spanos & Gorassini, 1984). A possible explanation for this phenomenon may lie in the structure of experimental situations, which may create ambiguity for participants regarding their classification of their responses to requests (Spanos & Gorassini, 1984). The requests in these experiments ask for participants to make a series of somewhat

'arbitrary' motor responses with no meaningful goal-directed sequence. This is in stark contrast to behaviours in everyday situations, which are carried out to achieve a particular purpose. Nevertheless, the relative frequency of such responding following hypnotic and non-hypnotic procedures (e.g. task-motivation instructions) remains to be determined. Researchers and clinicians often assume that an intended suggestion acts as suggestion and a request acts as a request. However these findings, although found in only a minority of participants, raise an important issue that intended requests may indeed be interpreted and function as suggestions, which may in-turn confound results and have unforeseen consequences therapeutically (Weitzenhoffer, 1974, 2000)

8.1.3. Planned behaviours

The recipient of a suggestion may engage either to refrain from making the suggested response or to make the suggested response (Gorassini, 1997, 2004). Gorassini (1988-1989, 1997) proposed four different strategies, each leading to a different response pattern, which could reasonably be formulated in response to a suggestion. He postulated that two strategies would result in responses contrary to a suggestion. As suggestions imply that a response will happen by itself, caused by a source external to the self, participants accordingly may plan to: (i) wait for an involuntary response to occur – *wait strategy*; (ii) use imagery which is often requested by suggestions (e.g. 'regard your arm as heavier than lead'), but refrain from making the suggested response – *imagine strategy.*

On the other hand participants may directly produce the suggested response, which may take one of two strategy forms with participants planning to: (iii) comply with the suggestion and attempt to behave in accordance with the suggestion and appear to be experiencing an involuntary response – *cold acting strategy*; (iv) make the suggested response in an attempt to generate suggested experiences, sensations, emotions and associated involuntariness – *hot acting strategy.*

Several studies have investigated the relationship between plans and hypnotic responding (Gorassini, 1988-1989, 1997; Katsanis, Barnard & Spanos, 1988-1989; Silva & Kirsch, 1992; Spanos, Burnley & Cross, 1993). The pattern of findings in most of these investigations is similar, and taken together the results from these studies reveal that approximately 75% of participants indicate planning to wait for suggested responses to occur by themselves. Of these 75%, half planned to solely wait for a response to occur (wait strategy) and half planned to use imagery in conjunction with waiting (imagine strategy). 10% of participants revealed that they planned to only comply with the suggestions (cold act strategy), whilst the remaining 15% reported planning to make the suggested responses in addition to attempting to produce the suggested experiences (hot acting strategy). Hypnotic responding has been consistently reported as correlating negatively with waiting, not at all with cold acting and positively with hot acting (Gorassini, 1988-1989, 1997; Katsanis et al., 1988-1989; Silva & Kirsch, 1992, Spanos et al., 1993). The correlation between hypnotic responding and wait plans with imagery has been shown to be positive in some studies (Gorassini, 1997; Silva & Kirsch, 1992; Spanos et al., 1993), or absence in others (Gorassini, 1988-1989; Katsanis et al., 1988-1989). Both Gorassini (1997) and Silva and Kirsch (1992) argue that the positive correlation between imagining and hypnotic performance is the result of a misclassification of the hot act strategy, due to a failure to recognise the source of volition and a high awareness of instructions to concentrate on imaginings. This research is supportive of the notion that hypnotic responding does not purely involve involuntary control and signifies that planned behaviours achieved through self-deception (hot acting), may play an important role in responding to hypnotic suggestions (Gorassini, 1997, 2004)

8.1.4. Request-to-suggestion carryover

Although researchers have given considerable attention to delineating the nature and differences between responding to suggestions and requests, they have not examined in a systematic way the influence of compliance with a prior request on responses to suggestion. As far as the author is aware only one study has examined how behaviour performed in

response to requests influences responsiveness to suggestion. In a unique study by Gorassini (2002), 20 participants were initially requested to raise an outstretched arm (move condition) or to hold an outstretched arm still but imagine it rising (hold still condition). All participants were found to comply with the particular request given. Subsequently, all participants were administered suggestions, in a non-hypnotic context, for arm rising movements. The results indicated that eight out of the ten participants in the move condition (i.e. were earlier requested to move) produced the suggested movements, whilst suggested responses failed to occur in all ten participants in the hold still condition. The study provides evidence supporting a request-to-suggestion carryover effect, with participants failing to exhibit movements if initially requested to hold still, but exhibiting suggested movements if initially requested to move.

One possible explanation for this effect is that compliance with the request influenced task strategies for responding to the suggestion (Haley, 1958). In other words, participants who produced an arm movement in response to the *request* to move believed that a similar movement was required in response to the *suggestion* to move. In contrast, participants who kept their arms motionless in response to the hold still request believed that a similar lack of movement was required in response to the suggestion to move (Gorassini, 2002; Haley, 1958). Another possible explanation for the request-to-suggestion carryover effect may be attributed to a response set (e.g. Kirsch, 2000a). Participants may have learned to act in a certain way, to move or hold still, in response to initial requests, which could have resulted in the formation of a response set linking communications regarding arm movements to responses. Subsequent suggestions to move may have automatically elicited the learned response to either move or hold still (Gorassini, 2002; Kirsch 2000a).

Although the study provides evidence of robust request-to-suggestion carryover, caution needs to be taken when interpreting these findings. The principal shortcoming of Gorassini's (2002) study was that it only measured behavioural responses and failed to measure whether participants experienced suggested scenarios as subjectively real and

involuntary – both of which are hallmarks of a true response to a suggestion (e.g. Lynn et al., 1990; Weitzenhoffer, 1953). In the absence of measured involuntariness and subjective experience, the behavioural responses to suggestions could have simply been due to compliance. There was also no way of determining whether participants were actually responding to requests voluntarily. A second fundamental limitation of Gorassini's (2002) study was its lack of assessment of processes potentially responsible for the carryover phenomenon. Finally, the request-to-suggestion carryover was demonstrated using only a very small sample (N = 20) and one ideomotor suggestion for arm movement. It remains to be seen whether request-to-suggestion carryover would still occur with a larger sample of participants and with a greater variety of ideomotor, cognitive and challenge suggestions.

8.1.5. Study objectives

Given that the practice of making requests is inextricably linked to the administering of suggestions and hypnotic induction procedures in general, it is important to know the conditions under which compliance with requests influences responsiveness to suggestions. The findings of Gorassini (2002) indicate that compliance with a request can have a major impact on responsiveness to an ideomotor suggestion in a non-hypnotic context. However, therapeutic and experimental suggestions are usually administered in a hypnotic context. The influence of compliance to requests on responsiveness to a variety of suggestions in a hypnotic context has yet to be systematically investigated. The first aim of the current study was to examine the influence of compliance to requests in a hypnotic context on suggestibility. The second aim of the study was to address the role of strategy selection in responses to suggestion in both non-hypnotic and hypnotic contexts. The current investigation also addressed the principal shortcomings of the Gorassini (2002) study by including measures of subjective experience and involuntariness for both suggestions and requests.

A similar method to that used in Study 2 and Study 4 was employed. Participants were initially presented with a suggestibility measure in the absence of any formal instructions or mention of hypnosis. A hypnotic context was then established and participants were presented with the suggestibility measure for a second time following either: (i) standard relaxation instructions (RX condition); (ii) requests to actively produce movements plus relaxation instructions (MOVE condition); or (iii) requests to imagine movements plus relaxation (IMAG condition). Behavioural, subjective and experienced involuntariness measures of responsiveness to suggestion were obtained. Strategies used by participants to respond to suggestions were also measured. It was hypothesised that suggestibility would significantly increase following requests to: (i) make movements (MOVE condition) and (ii) imagine movements (IMAG condition), with suggestibility change in these two groups being significantly greater than relaxation instructions alone (RX condition). The data reviewed above allowed for the possibility that requests to make movements may have a considerable influence on behavioural responses. Previous research indicates that response control in a hypnotic context is similar to response control outside of a hypnotic context. It was thus expected that responding to suggestion would be negatively correlated with wait plans and positively correlated with hot acting in both non-hypnotic and hypnotic contexts.

8.2 Method

8.2.1. Design

For the reasons outlined in Chapter 5 (section 5.2.1.), the influence of compliance to requests on responsiveness to suggestion was tested in a 3 x 2 (condition x context) between-within design, with induction condition as the three level independent variable (RX vs. MOVE vs. IMAG). Participants in each of the three experimental conditions received suggestions in both non-hypnotic (SA_1: first suggestibility assessment) and hypnotic contexts (SA_2: first suggestibility assessment). In line with the methodology used in the previous three studies and the recommendations by Braffman and Kirsch (1999), the

order of non-hypnotic and hypnotic assessments of suggestibility were not counterbalanced. Changes in behavioural, subjective and experienced involuntariness suggestibility scores from SA_1 to SA_2 were the principle dependent variables.

8.2.2. Measures

8.2.2.1 Suggestibility scale

As in Study 4, suggestibility was measured on the Waterloo-Stanford Group Scale of Hypnotic Susceptibility Form C: (WSGC; Bowers, 1993, 1998; Kirsch et al., 1998). The WSGC is a group adaptation of the individually administered Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C; Weitzenhoffer & Hilgard, 1962), and consists of twelve test suggestions. The same adapted WSGC used in Study 4 was used in this study (see Chapter 7, section 7.2.2.1). Four test suggestions were deemed unsuitable for repeated presentation (age regression; negative visual hallucination; posthypnotic suggestion; amnesia), and consequently the adapted WSGC consisted of eight suggestions in total and included two ideomotor suggestions (hand lowering; moving hands together), two challenge suggestions (arm rigidity; arm immobilisation), and four cognitive suggestions (dream; mosquito hallucination; music hallucination; taste hallucination). Two versions of the scale were created, with the same items in different testing orders, which were counterbalanced and presented across the conditions. However, the relative order of ideomotor, challenge and cognitive suggestion was always maintained across the two tests. The scale was used to measure suggestibility before the induction manipulation (SA_1) and after the induction manipulation (SA_2).

The scoring of the suggestibility items was adapted from the WSGC (*behavioural*: Bowers, 1998; *subjective*: Kirsch et al., 1998) and the CURSS (*involuntariness*: Spanos et al., 1983) and is described in detail in Chapter 7, section 7.2.2.1. However, for convenience, the behavioural, subjective and experienced involuntariness scoring of the suggestibility items will also be briefly described here. Self-reported behavioural responses to suggestions were

obtained by having participants indicate whether the behavioural response called for by the suggestion occurred or not (0 = *no*; 1= *yes*). Total behavioural scores were the sum of these ratings (range 0-8). Subjective responses to suggestions were obtained by having participants rate on a 5-point Likert scale, the degree to which they felt the subjective effects called for by each suggestion (1 = *not at all*; 5 = *to a great degree*). Subjective experience of responsiveness to suggestion was assessed as the sum of these ratings (range 8-40). Finally, experienced involuntariness scores were obtained by having participants rate the degree to which their response to each suggestion was experienced as involuntary (0 = *not at all*; 3 = *great degree).* Participants were scored as experiencing involuntariness for each suggestion, if the classic combination of behavioural occurrence and non-volitional experiencing occurred. Therefore, a score of 1 was given, if the behavioural criterion had been passed and involuntariness was either rated moderate or rated high (see section 7.2.2.). Otherwise a failing score of 0 was given. Experienced involuntariness of responding to suggestion was assessed as the sum of these ratings (range 0-8).

8.2.2.2. Strategy choice

Strategies used by participants to respond to suggestions were assessed following SA_1 (non-hypnotic context) and SA_2 (hypnotic context). Strategy selection was measured using a planning questionnaire (Gorassini 1988-1989, 1997; planning questionnaire presented in Appendix 8.1), which describes four actions strategies – wait, imagine, cold act, and hot act – per suggestion. Participants selected the one alternative that best characterised their planning. For example, for the arm rigidity suggestion, which suggested that an outstretched arm was becoming stiff and unable to bend, the alternatives were:

(i) Did you plan simply *to wait*? When you heard this suggestion, you may have thought something like the following: 'The suggestion is predicting that the arm will stiffen automatically'. Thus, you chose to refrain from stiffening the arm deliberately, and to observe if it became stiffer on its own.

(ii) Did you plan *to produce imaginings*? When you heard this suggestion, you may have thought something like the following: 'I am expected to imagine-along with the suggestion, and this will lead automatically to the arm getting stiff'. Thus you chose to imagine-along with the suggestion, but you refrained from making the arm go stiff deliberately.

(iii) Did you plan *to produce the response deliberately*? When you heard this suggestion you may have thought something like the following: 'I am expected simply to stiffen the arm deliberately'. Thus you chose to stiffen the arm deliberately.

(iv) Did you plan *to create a realistic experience in yourself*? When you heard this suggestion, you may have thought something like the following: 'The suggestion would like me to make the arm feel realistically as if it can not bend'. Thus, you made the arm stiff and simultaneously tried to make the arm feel as if it could not be bent.

For each item, planning with respect to the item's principal response was assessed. Four planning scores – wait, imagine, cold act, and hot act – were obtained. They reflected the frequency over the eight suggestions that each of the plans was endorsed, in both non-hypnotic (SA_1) and hypnotic (SA_2) contexts. In line with Gorassini (1997), a count score per suggestion was also calculated to assess internal consistency of the planning questionnaire. The count score indicated the number of responses beyond waiting that was planned. The wait strategy was scored 0; the imagine and cold act strategies were scored 1; and the hot act strategy was scored 2. Response count scores ranged from 0-2 per suggestion and internal consistency coefficients for non-hypnotic and hypnotic planning were 0.81 and 0.79, respectively, indicating high reliability.

8.2.3. Hypnotic context and inductions

A hypnotic context was explicitly established by making reference to hypnosis after SA_1, using the following instructions adapted from Braffman & Kirsch (1999):

> 'In this second part of the study, we want to assess your ability to experience the same suggestions, only this time we will ask you to experience them whilst in hypnosis. So in this version, the suggestions will be preceded by a hypnotic induction to help you become hypnotised.'

Three induction conditions were created each consisting of either: initial relaxation instructions, plus additional relaxation instructions (RX condition); requests to actively produce movements, plus relaxation instructions (MOVE condition); or requests to imagine movements, plus relaxation instructions (IMAG condition; instructions for relaxation and requests to produce and imagine movements presented in full in Appendix 8.2). The relaxation instructions common to all induction conditions were adapted from the CURSS (Spanos et al., 1983) and were included in order to provide a realistic hypnotic context and to maximise responsiveness to suggestions in all conditions. These instructions served as a standard relaxation procedure (adapted relaxation instructions presented in Appendix 5.5). All instructions and suggestions were recorded onto audio compact disc to increase experimental control.

8.2.4. Requests

Prior to SA_2, participants in the MOVE and IMAG conditions received three requests for: (i) *a head movement* consisting of the head falling forward till it touched the chest; (ii) *an arm movement* consisting of an arm-out-front to arm-pointing-straight-up motion; and (iii) *a hand clasp movement* consisting of clasping both hands together tightly with the fingers interlaced. Participants in the MOVE condition were requested to *make* each one of these movements. In contrast, participants in the IMAG condition were requested only to *imagine*

each one of these movements (see Appendix 8.2). To determine the nature of responses to these requests (e.g. were they carried out; were they experienced as voluntary) behavioural and experienced involuntariness scores were obtained for each request (full questionnaire assessing responses to requests presented in Appendix 8.3). Participants were required to rate on a dichotomous scale (0 = *no*; 1= *yes*) whether they responded to each request. Behavioural responses to requests were assessed as the sum of these ratings (range 0-3). Experienced involuntariness for responses to requests were assessed using a 4-point Likert scale on which participants rated their response to each request as being involuntary (0 = *not at all*; 3 = *great degree*). Involuntariness responses to requests were assessed as the sum of these ratings (range 0-12).

In contrast to those in the MOVE and IMAG conditions, participants in the RX condition did not receive explicit movement related requests prior to SA_2. Instead, they received relaxation instructions that emphasised feeling pleasantly comfortable and relaxed (see Appendix 8.2).

8.2.5. Participants

In all 105 participants (55 males & 50 females) took part in this study. All participants were undergraduate and graduate university students, with the majority being recruited from University College London. The age of participants ranged from 18-34 years, with a mean age of 20.53 years (SD = 2.52). All signed up for an experiment entitled, 'the influence of state and context on behaviour', and participated in one of the following three conditions: RX (N = 35, 17 male, 18 female); MOVE (N = 35, 18 male, 17 female) or IMAG (N = 35, 20 male, 15 female). Participants were randomly allocated to conditions on the day of assessment, and were tested in small groups of 2-5 participants. Psychology students were excluded from this study due to their experience with hypnotic procedures during their course and familiarity with the investigators. The joint UCL/UCLH Committee on the

Ethics of Human Research approved this study; informed consent was obtained from all participants.

8.2.6. Procedure

Participants were tested in small groups (2-5 participants) in a quiet room. After reading the study information sheet and providing consent, all participants were presented with SA_1. Participants were informed that is was a measure of their ability to involve themselves in various experiences. After scoring SA_1 and strategy selection responses, a hypnotic context was explicitly established and participants were given an explicit opportunity to withdraw from the study. Participants were then given either: relaxation instructions (RX condition); requests to actively produce movements, plus relaxation instructions (MOVE condition); or requests to imagine movements, plus relaxation instructions (IMAG condition), depending on which experimental condition they had been assigned to. SA_2 was then presented and behavioural, subjective and experienced involuntariness measures of responsiveness to suggestion were scored and strategy selection responses obtained for the second time. In addition, responses to requests were assessed for participants in the MOVE and IMAG conditions. At the end of the session participants were asked to respond to a set of questions that asked what they thought the experiment was about: i) *before they arrived at the testing session;* ii) *after the first set of suggestions;* and iii) *after the second set of suggestions.*

8.2.7. Statistical analyses

SPSS for Mac OS X (version 11) was used for the analyses of data. The effects of Condition on (i) suggestibility (behavioural, subjective, involuntariness) and (ii) strategy dimensions, were tested using a 3 x 2 (condition vs. context) between-within analyses of covariance (ANCOVA). Suggestibility/strategy scores at SA_1 were taken as covariates. Comparison of the means were carried out by Fisher's protected least significant difference (LSD) test (Carmer & Swanson, 1973; Howell, 1997). For each suggestibility and strategy dimension measure, a paired-samples Student's t-test was performed comparing suggestibility/strategy

scores for the first suggestibility assessment (SA_1), with suggestibility/strategy scores for the second suggestibility assessment (SA_2). A rejection region of at least value $p < 0.05$ was selected and used throughout (Tabachnick & Fidell, 2001).

8.3. Results

Naivety concerning the experiment involving hypnosis and hypnotic procedures was maintained throughout the study for almost all participants. However five participants from the RX condition; one participant from the MOVE condition; and three participants from the IMAG condition reported that the experiment *might have* been related to hypnosis after the first assessment of suggestibility (SA_1). Means and correlation were calculated for both the full sample and sub-sample of participants who reported no awareness or suspicion that the study concerned hypnosis. The patterns of means and correlations were virtually identical for the two data sets, so analyses of the full sample are reported here.

Means and standard deviations of responses to suggestion in both non-hypnotic (SA_1) and hypnotic (SA_2) contexts are presented in Table 8.1 and Figure 8.1. As an important part of the analyses, quantification of the effect of condition on responsiveness to suggestion was calculated (see Table 8.1). The data were screened for univariate and multivariate outliers. No cases were found to have standardised scores in excess of ± 3.29 ($p < 0.001$, two-tailed test). The data were normally distributed, with no skewness and kurtosis values exceeding standardised scores of ± 3.29 ($p < 0.001$, two-tailed test). Mahalanobis distances (critical values, $\chi^2_{(6)} = 22.458$, $p < 0.001$) were calculated. No cases were found to have Mahalanobis distances greater that the critical value demonstrating the absence of multivariate outliers.

Table 8.1. Mean (standard deviation) responses to suggestions for the relaxation (RX), requests to produce movements (MOVE) and requests to imagine movements (IMAG) conditions, in both non-hypnotic (SA_1) and hypnotic (SA_2) contexts.

	Behavioural			Subjective			Involuntariness		
	SA_1	SA_2	Effect Size	SA_1	SA_2	Effect Size	SA_1	SA_2	Effect Size
RX	3.31 (1.86)	3.71 (2.04)	0.21	20.03 (5.52)	21.20 (6.26)	0.20	2.46 (1.74)	2.34 (1.63)	-0.07
MOVE	3.09 (1.56)	4.77 (1.37)	1.16	19.77 (5.30)	20.74 (5.16)	0.19	2.37 (1.68)	2.26 (1.58)	-0.07
IMAG	2.91 (1.46)	4.03 (1.81)	0.69	18.00 (5.14)	22.06 (5.87)	0.75	2.26 (1.65)	3.34 (1.81)	0.63

Note.

Behavioural scores are ratings of behavioural responses to suggestions & are defined as the number of suggestions passed out of eight. *Subjective scores* are ratings of degree to which participants felt the subjective effects called in each suggestion & were rated out of forty (i.e. measured on a scale of 1-5 for each of the eight suggestions). *Involuntariness scores* are ratings of experienced involuntariness of suggestions & defined as the number of suggestions passed out of eight

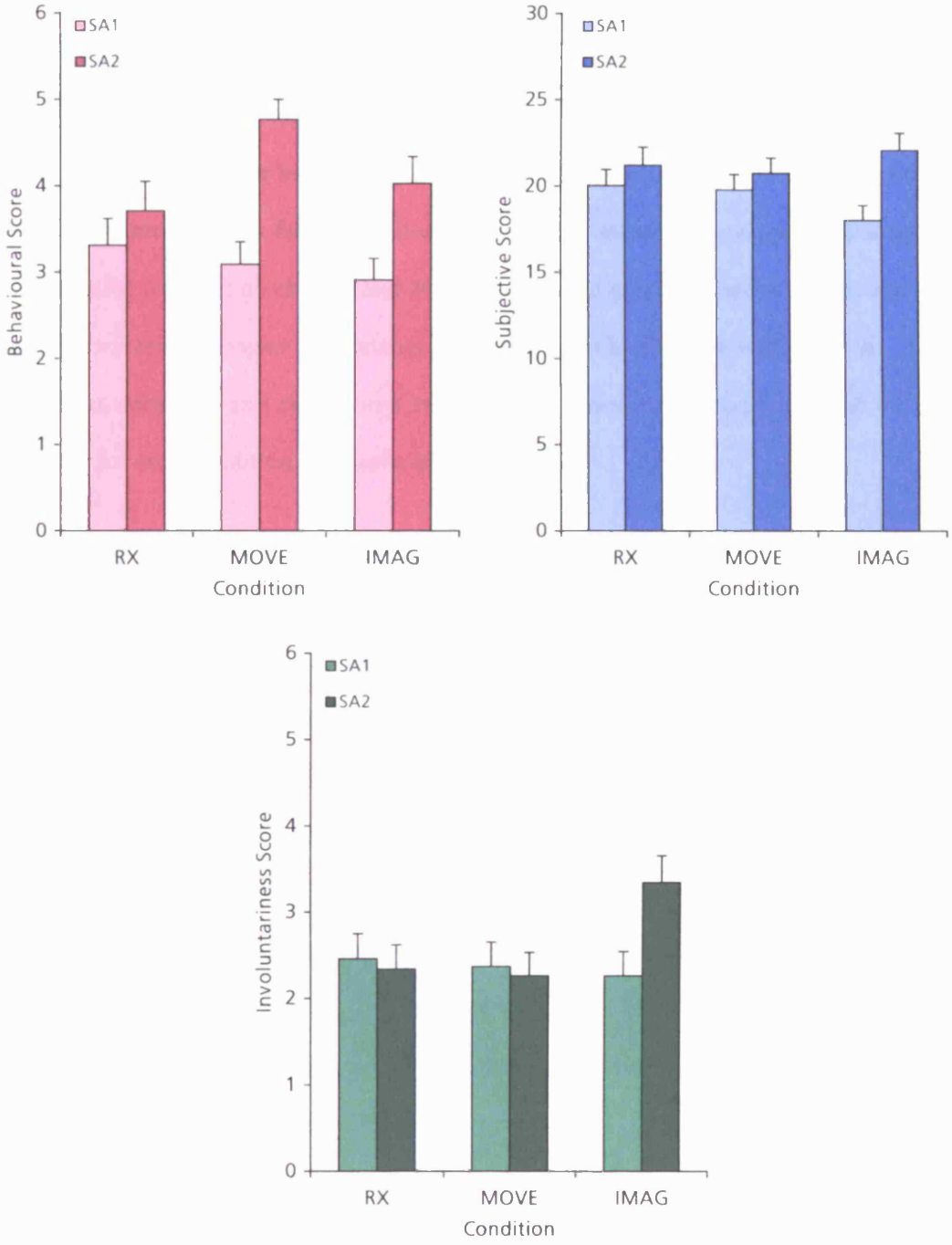
Table 8.2. Frequency distribution (percentages) of changes in behavioural, subjective and experienced involuntariness measures of suggestibility as function of instructions for relaxation (RX), requests to produce movements (MOVE) and requests to imagine movements (IMAG)

	Behavioural			Subjective			Involuntariness		
	Decrease	Same	Increase	Decrease	Same	Increase	Decrease	Same	Increase
RX	6 (17%)	15 (43%)	14 (40%)	13 (37%)	5 (14%)	17 (49%)	12 (34%)	15 (43%)	8 (23%)
MOVE	0 (0%)	2 (6%)	33 (94%)	9 (26%)	3 (8%)	23 (66%)	6 (17%)	25 (71%)	4 (12%)
IMAG	4 (12%)	5 (14%)	26 (74%)	4 (12%)	1 (3%)	30 (85%)	5 (14%)	4 (12%)	26 (74%)

Note.

A *decrease* was when participants' responses to suggestion were lower at SA_2 (after an induction) when compared to their responses at SA_1 (prior to an induction). *Same* refers to when participants' responses to suggestions were the same at both SA_1 and SA_2. An *increase* was when participants' responses to suggestion were higher at SA_2 when compared to their responses at SA_1

Figure 8.1. Mean (standard error) behavioural, subjective and involuntariness suggestibility scores for the relaxation (RX), requests to produce movements (MOVE) and requests to imagine movements (IMAG) conditions



Correlations between non-hypnotic suggestibility (SA_1) and hypnotic suggestibility (SA_2) were significant for all measures in each condition: behavioural (RX: r = 0.777, $p < 0.001$; MOVE: r = 0.696, $p < 0.001$; IMAG: r = 0.702, $p < 0.001$); subjective (RX: r = 0.778, $p < 0.001$; MOVE: r = 0.872, $p < 0.001$; IMAG: r = 0.778, $p < 0.001$); experienced

involuntariness (RX: r = 0.755, $p < 0.001$; MOVE: r = 0.916, $p < 0.001$; IMAG: r = 0.775, $p < 0.001$). Concerning behavioural responses, 6 participants (17%) in the RX condition passed fewer suggestions following instructions for relaxation only, 15 (43%) showed no change at all, and 14 (40%) exhibited greater suggestibility. No participants in the MOVE condition showed a decrease in behavioural scores, with 2 participants (6%) showing no change, and 33 (94%) showing a greater behavioural response following requests to make movements. Four participants (12%) in the IMAG condition reported reduced behavioural responses, whilst 5 (14%) reported no change, and 26 (74%) reported greater behavioural responses following requests to imagine movements. The frequency distributions of changes in behavioural, subjective and experienced involuntariness measures of responsiveness to suggestion for each condition are displayed in Table 8.2.

8.3.1. Effect of condition on suggestibility

The ANCOVA for behavioural scores indicated a significant main effect for Condition [$F_{(2,101)} = 9.053$, $p < 0.001$]. This effect revealed that change in behavioural suggestibility scores was significantly different between: (i) the IMAG and RX conditions [LSD test, $p < 0.05$]; (ii) the MOVE and IMAG conditions [LSD test, $p < 0.05$]; and (iii) the MOVE and RX conditions [LSD test, $p < 0.001$]. There were no significant differences in behavioural suggestibility scores for Condition at SA_1. Behavioural scores significantly increased, from SA_1 to SA_2, for both the MOVE [$t_{(34)} = 8.617$, $p < 0.001$] and IMAG conditions [$t_{(34)} = 5.067$, $p < 0.001$]. No significant difference in behavioural scores, from SA_1 to SA_2, was found for the RX condition.

As with behavioural scores, the ANCOVA for subjective scores indicated a significant main effect for Condition [$F_{(2,101)} = 7.185$, $p < 0.001$]. This effect revealed that change in subjective suggestibility scores was significantly different between: (i) the IMAG and RX conditions [LSD test, $p < 0.01$]; and (ii) the IMAG and MOVE conditions [LSD test, $p < 0.001$]. The difference between the MOVE and RX conditions on change in subjective

suggestibility scores was non-significant. There were no significant differences in subjective suggestibility scores for Condition at SA_1. Paired-samples t-tests revealed a significant increase in subjective scores from $SA_1$to SA_2, for both the MOVE [$t_{(34)} = 2.168$, $p < 0.05$] and IMAG conditions [$t_{(34)} = 6.429$, $p < 0.001$]. No significant difference in subjective scores from $SA_1$to SA_2, was found for the RX condition.

The ANCOVA for experienced involuntariness scores indicated a significant main effect for Condition [$F_{(2,101)} = 16.319$, $p < 0.001$]. This effect revealed that change in experienced involuntariness suggestibility scores was significantly different between: (i) the IMAG and RX conditions [LSD test, $p < 0.001$]; and (ii) the IMAG and MOVE conditions [LSD test, $p < 0.001$]. The difference between the MOVE and RX conditions on change involuntariness suggestibility scores was non-significant. As with both behavioural and subjective scores, there were no significant differences in experienced involuntariness suggestibility scores for Condition at SA_1. Experienced involuntariness scores were only found to significantly increase, from $SA_1$to SA_2, for the IMAG condition [$t_{(34)} = 5.478$, $p < 0.001$]. No significant differences in experienced involuntariness scores, from $SA_1$to SA_2, were found for either the MOVE or RX conditions.

8.3.2. Effect of condition on strategy dimensions

Means and standard deviations for strategy scores in each condition are presented in Table 8.3 and Figure 8.2. Correlations between strategy and suggestibility dimensions are presented in Table 8.4.

Table 8.3. Mean (standard deviation) strategy scores reported in non-hypnotic (SA_1) and hypnotic (SA_2) contexts.

	Wait		Imagine		Cold Act		Hot Act	
	SA_1	SA_2	SA_1	SA_2	SA_1	SA_2	SA_1	SA_2
RX	3.71 (1.67)	3.20 (1.37)	1.86 (1.48)	2.31 (1.62)	1.09 (0.98)	0.80 (0.80)	1.34 (0.91)	1.71 (1.34)
MOVE	3.74 (2.63)	2.26 (1.79)	2.23 (2.39)	1.37 (1.63)	0.77 (1.70)	3.91 (2.03)	1.26 (1.79)	0.49 (0.78)
IMAG	3.86 (2.07)	1.80 (1.51)	1.91 (1.90)	3.17 (1.64)	0.94 (1.11)	0.77 (0.94)	1.29 (1.58)	2.23 (1.66)

Note.

Planning scores – wait, imagine, cold act, and hot act – reflect the frequency over the eight suggestions that each of the plans were endorsed

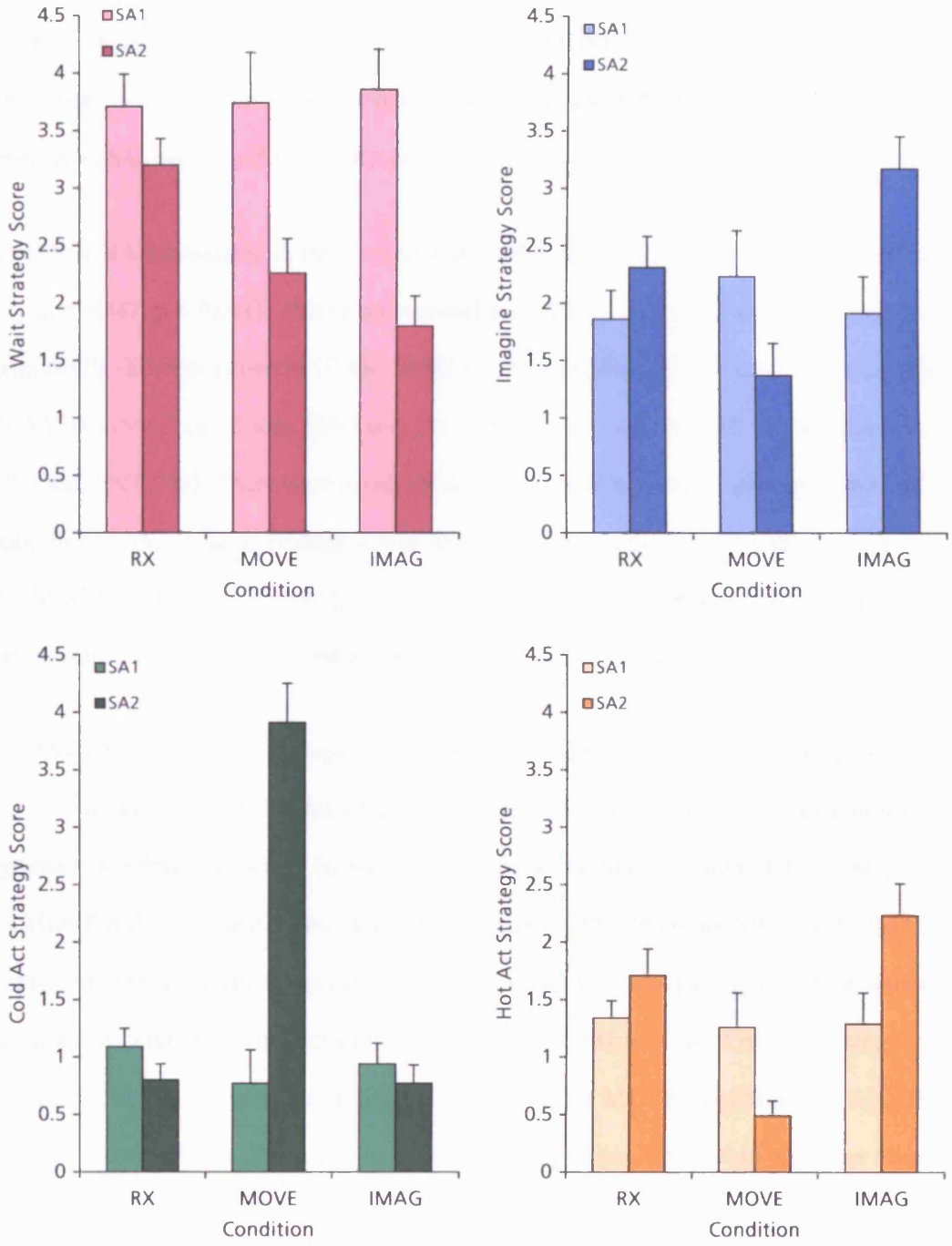
Table 8.4. Correlations between strategy and suggestibility scores in both non-hypnotic (SA_1) and hypnotic (SA_2) contexts

	Non-hypnotic context (SA_1)			Hypnotic context (SA_2)		
	Behavioural	Subjective	Involuntariness	Behavioural	Subjective	Involuntariness
RX						
Wait	-0.35*	-0.32	-0.30	-0.49**	-0.41*	-0.48**
Imagine	0.04	0.05	0.14	-0.07	-0.07	0.03
Cold Act	0.23	0.09	-0.02	0.31	0.21	0.03
Hot Act	0.34*	0.41*	0.35*	0.38*	0.38*	0.42*
MOVE						
Wait	-0.35*	-0.29	-0.36*	-0.48**	-0.35*	-0.27
Imagine	0.11	0.04	0.04	-0.28	-0.25	-0.06
Cold Act	-0.04	-0.07	0.11	0.50*	0.34*	0.17
Hot Act	0.39*	0.44**	0.36*	0.35*	0.39*	0.30*
IMAG						
Wait	-0.27	-0.33	-0.38*	-0.66***	-0.64**	-0.65***
Imagine	-0.11	0.07	0.09	0.35*	0.50**	0.47**
Cold Act	-0.01	-0.16	-0.17	-0.20	-0.27	-0.21
Hot Act	0.38*	0.36*	0.40*	0.56**	0.40*	0.40*

Note.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Figure 8.2. Mean (standard error) wait, imagine, cold act and hot act strategy scores for the relaxation (RX), requests to produce movements (MOVE) and requests to imagine movements (IMAG) conditions



The ANCOVA for *wait* strategy scores indicated a significant main effect for Condition [$F_{(2,101)} = 6.232$, $p < 0.01$]. This effect revealed that change in wait strategy scores was significantly different between: (i) the IMAG and RX conditions [LSD test, $p < 0.001$]; and (ii) the MOVE and RX conditions [LSD test, $p < 0.025$]. The difference between the IMAG

and MOVE conditions on change in wait strategy scores was non-significant. There were no significant differences in wait strategy scores for Condition at SA_1. Wait strategy scores significantly decreased, from $SA_1$to SA_2, for both the MOVE [$t_{(34)} = -2.926$, $p < 0.01$] and IMAG conditions [$t_{(34)} = -5.958$, $p < 0.001$]. No significant difference in wait strategy scores, from $SA_1$to SA_2, was found for the RX condition.

The ANCOVA for *imagine* strategy scores indicated a significant main effect for Condition [$F_{(2,101)} = 9.847$, $p < 0.001$]. This effect revealed that change in imagine strategy scores was significantly different between: (i) the IMAG and RX conditions [LSD test, $p < 0.05$]; (ii) the MOVE and IMAG conditions [LSD test, $p < 0.001$]; and (iii) the MOVE and RX conditions [LSD test, $p < 0.025$]. There were no significant differences in imagine strategy scores for Condition at SA_1. Imagine strategy scores significantly increased, from $SA_1$to SA_2, only for the IMAG condition [$t_{(34)} = 3.016$, $p < 0.01$]. No significant differences in imagine strategy scores from $SA_1$to SA_2 were found for either the RX or MOVE conditions.

The ANCOVA for *cold act* strategy scores indicated a significant main effect for Condition [$F_{(2,101)} = 61.441$, $p < 0.001$]. This effect revealed that change in cold act strategy scores was significantly different between: (i) the MOVE and RX conditions [LSD test, $p < 0.001$]; (ii) the MOVE and IMAG conditions [LSD test, $p < 0.001$]. The difference between the IMAG and RX conditions on change in cold act strategy scores was non-significant. There were no significant differences in cold act strategy scores for Condition at SA_1. Cold act strategy scores significantly increased, from $SA_1$to SA_2, only for the MOVE condition [$t_{(34)} = 7.338$, $p < 0.001$]. No-significant differences in cold act strategy scores, from $SA_1$to SA_2, were found for either the IMAG or RX conditions.

The ANCOVA for *hot act* strategy scores indicated a significant main effect for Condition [$F_{(2,101)} = 17.474$, $p < 0.001$]. This effect revealed that change in hot act strategy scores was significantly different between: (i) the MOVE and RX conditions [LSD test, $p < 0.001$]; (ii) the MOVE and IMAG conditions [LSD test, $p < 0.001$]. The difference between the IMAG and RX conditions on change in hot act strategy scores was non-significant. There were no

significant differences in hot act strategy scores for Condition at SA_1. Hot act strategy scores significantly increased, from $SA_1$to SA_2, for the IMAG condition [$t_{(34)} = 2.657$, $p < 0.025$]. In contrast, hot act strategy scores significantly decreased, from $SA_1$to SA_2, for the MOVE condition [$t_{(34)} = -3.271$, $p < 0.01$]. No significant difference in hot act strategy scores from $SA_1$to SA_2 was found for the RX condition.

8.3.3. Manipulation check

Independent samples t-tests were used to analyse the behavioural and involuntariness responses to requests for participants in the MOVE (requests to make movements) and IMAG (requests to imagine movements) conditions. These analyses were used to determine whether the inductions used, actually produced the effects they were designed for (i.e. to elicit responses to requests). The mean behavioural score for responses to requests was 2.77 ($SD = 0.60$) for the MOVE condition and 1.03 ($SD = 0.98$) for the IMAG condition. Independent samples t-tests indicated that behavioural responses to requests were significantly higher for the MOVE condition in comparison with the IMAG condition [$t_{(68)} = 8.948$, $p < 0.001$]. The mean experienced involuntariness score for responses to requests was 3.26 ($SD = 2.75$) for the MOVE condition and 3.20 ($SD = 2.44$) for the IMAG condition. Independent sample t-tests indicated no significant differences between the MOVE and IMAG conditions with respect to experienced involuntariness scores for responses to requests.

8.4 Discussion

8.4.1. Effect of condition on responses to suggestion

This study set out to examine the influence of compliance to requests, in a hypnotic context, on suggestibility. In line with expectation, behavioural and subjective measures of responsiveness to suggestion increased significantly (from $SA_1$to SA_2), following requests to actively produce movements (MOVE condition). Indeed the mean effect size of requesting

participants to actively produce movements on behavioural responses to suggestion was large. The inclusion of requests to imagine movements (IMAG condition) not only resulted in significant increases in behavioural and subjective suggestibility, but also in experienced involuntariness of responses to suggestion. The mean effect sizes of requesting participants to imagine movements on all measures of suggestibility were substantial, varying from 0.63 to 0.75 (see Chapter 3). Neither behavioural, subjective nor involuntariness measures of suggestibility significantly increased following instructions for relaxation in a hypnotic context (RX condition). Moreover, increases in behavioural responses to suggestion were significantly higher for the MOVE condition compared to the IMAG and RX conditions. Whereas, increases in subjective and involuntariness responses to suggestions were significantly higher in the IMAG condition compared to both the MOVE and RX conditions. As predicted, these findings are supportive of the request-to-suggestion carryover effect reported by Gorassini (2002), indicating that compliance to requests has a major impact on responsiveness to suggestion. Specifically, requests to make movements have a significant impact on behavioural responses to suggestion, whilst requests to imagine movements appear to effect subjective and involuntariness aspects of responding to suggestion in addition to the behavioural component.

8.4.2. Effect of condition on strategy dimensions

Another key aim of the study was to address the role of strategy selection in responses to suggestion in both non-hypnotic and hypnotic contexts, allowing an assessment of the potential processes responsible for the carryover phenomenon. In the non-hypnotic context (which was identical for each condition), on average, 47% of participants, in all conditions, indicated that they solely planned to wait for suggested responses to occur (wait strategy). 25% of participants indicated that they planned to use imagery, which is often requested by the suggestions (imagine strategy). 12% planned to comply with the suggestions attempting to behave in accordance with the suggestions (cold act strategy). The remaining 16% of participants planned to respond by attempting to generate suggested experiences, sensations

and emotions (hot act strategy). These results are consistent with the findings on planning in a *hypnotic context* (e.g. Gorassini, 1988-1989; 1997; Katsanis et al., 1988-1989; Spanos et al., 1993). In addition, the current study found wait plans to significantly correlate negatively with responses to suggestions, whilst hot act plans were found to significantly correlate positively. Similar results were also reported by studies that investigated the relationship between planning and hypnotic responding (e.g. Gorassini, 1988-1989; 1997; Katsanis et al., 1988-1989; Spanos et al., 1993).

These findings may indicate that the hypnotic context per se does not determine planning behaviour, but it is the suggestions themselves that are responsible for them. Indeed as predicted, suggested responding was found to be negatively correlated with wait plans, and positively correlated with hot acting in both non-hypnotic and hypnotic contexts for all conditions. Further support for this notion comes from the planning behaviour of participants in the RX condition (who received relaxation instructions in a hypnotic context), which on the whole did not change. There were no significant changes in any of the four planning dimensions, from a non-hypnotic context (SA_1) to a hypnotic context (SA_2). The correlations between planning dimensions and responses to suggestions in the hypnotic context were also similar to the ones in the non-hypnotic context.

In contrast with the RX condition, planning behaviour for participants in both the MOVE and IMAG conditions significantly changed from SA_1 to SA_2. For participants in the MOVE condition, both wait and hot act strategy scores significantly *decreased*, whilst cold act strategy scores significantly *increased*. Indeed, the increase in cold-act strategy scores for the MOVE condition was significantly higher when compared to changes in these scores for both the IMAG and RX conditions. Participants in the IMAG condition, however, revealed a significant *increase* in imagine and hot act strategy scores. Moreover, these increases were significantly higher compared to imagine and hot act strategy score changes for both the MOVE and RX conditions. A similar significant decrease in wait strategy scores was found for the IMAG and MOVE conditions.

These results indicate that requests to make movements facilitate behaviour to comply and behave in accordance with suggestions, but not to generate the suggested subjective experiences. This may help to explain the large increase in behavioural suggestibility and the lack of increase in experienced involuntariness found for participants in the MOVE condition. Participants who made movements in response to requests may have believed that similar behavioural movements were merely required in responding to subsequent suggestions. Supportive of this is the finding that cold act strategy was significantly positively correlated with responding to suggestion following requests to make movements. Nevertheless, subjective responses to suggestions increased following responses to requests for movement, which indicates that participants in the MOVE condition did not only produce objective responses, but also experienced some of what was being suggested. This may have been as a consequence of requests to produce movements, the hypnotic context, or a combination of both. Evidence from participants from the RX condition, suggests that the hypnotic context alone would not have been responsible. An important next step would be to investigate the effect of responding to requests on a range of suggestions in a non-hypnotic context.

On the other hand, requests to imagine movements enhances: (i) plans to wait for suggested responses to occur, whilst planning to use imagery; and (ii) plans to self-deceive by behaving in accordance with suggestions and intending to produce the experiences that go with the suggestions. A possible explanation for the significant increases in behavioural, subjective and involuntariness measures of suggestibility for participants in the IMAG condition, may lie in the significant increases in imagine and hot act strategies. Both planning dimensions correlated significantly with suggested responding following requests to imagine movements. Although hot acting has consistently been found to correlate positively with suggested responding (e.g. Gorassini, 1988-1989; 1997; Katsanis et al., 1988-1989; Spanos et al., 1993), a positive correlation has only been observed in some studies (e.g. Gorassini, 1997; Silva & Kirsch, 1992). Silva and Kirsch (1992) argue that the positive relationship between imagining and hypnotic responding is a misclassification of the hot acting strategy,

due to a low awareness of information pointing to volition, and high awareness of instructions to concentrate on imaginings and use imagery (Gorassini, 1997). Consequently, participants may report using a imagine strategy, when in-fact a hot acting strategy was used.

This highlights a potential weakness of the current study with respect to imprecision in strategy measurement. As with previous studies, the current study relies on self-report methodology to reveal the strategies chosen and the link between strategy selection and suggested responses, which is open to potential distortion. According to Gorassini (1997), a random reporting error would result in a failure to report the actual strategy used in addition to reporting a strategy from a set of equally incorrect alternatives. However, if strategy reporting were generally accurate, but with some random error, then strategy response parallelism would be evident. The trend in research in this area, including this study generally supports strategy-performance parallelism indicating that strategy reporting on the whole is accurate. Although post-hoc reports of strategy selection may increase the likelihood of bias, Katsanis et al., (1988-1989) showed that obtaining plan results before or after administering suggestions had no effect on strategy reporting or responsiveness to suggestions (cf. Gorassini, 1997).

8.4.3. Interpretation of requests

The wording of requests (e.g. 'I want you to make/imagine a movement') clearly defines the participant as the source of response. Therefore, compared to suggestions, instructions should be explicitly interpreted as self-generated actions (Gorassini, 2004). Consequently, requests of a reasonable nature should almost always bring unanimous compliance. Indeed, participants that were requested to make movements produced almost unanimous behavioural responses. A minority of participants produced behavioural responses when requested to imagine movements. Requests should, if interpreted correctly, result in uniformly voluntary responses (e.g. Spanos & Gorassini, 1984), with experienced

involuntariness scores for requests being zero or very close to zero. The mean experienced involuntariness scores for requests for participants in the MOVE and IMAG conditions was low. However, they were not zero or as close to zero as one might expect, which implies that some participants may have responded to requests as they would suggestions. This phenomenon was also found in a minority of participants by Weitzenhoffer (1974) and Spanos and Gorassini (1984) and reiterates the importance of being aware of the type of communications (e.g. suggestions or instructions) being used, so as to counter potential unforeseen consequences.

8.4.4. Conclusions

In conclusion, it is evident that people do not only plan to wait passively for suggested responses to occur, in either non-hypnotic or hypnotic contexts. Planning to refrain from making responses was found to correspond to an absence of responding and therefore was consistently found to correlate negatively with suggested responding. Planning to self-deceive through hot acting was correlated positively and most reliably with suggested responding, as it results in the occurrence of suggested responses with accompanying non-volitional experience. Compliance to requests was found to have a major impact on responsiveness to suggestion. The present research carries important implications for the use of suggestion in psychotherapy, providing a potential means of increasing responsiveness to suggestion by shifting people's strategies from waiting to doing (Haley, 1958). Requests to make movements could be incorporated into clinical and experimental procedures to maximise behavioural responses to suggestion, whilst requests to imagine movements/scenarios could be used to enhance subjective reality and non-volition. Although the causal link between planned behaviour and responses to suggestions has yet to be established, this study indicates that suggested responding may be in part, conceptualised as planned actions.

Chapter 9

Conclusions

Chapter overview

The results of each of the empirical studies have been examined, analysed and discussed within the context of the scope of the thesis at the end of each chapter. This final chapter integrates the findings of the empirical work and proposes directions for the future development of research on suggestion and hypnosis.

9.1. Background and aims of the thesis

The thesis made a clear distinction from the outset between the hypothetical 'hypnotic state' and the phenomena produced by suggestions, proposing that suggestion is separable from hypnosis, despite the common practice of making no distinction between the two.

In Chapter 1 a review of the wider literature on suggestion and suggestibility revealed that although there is a no accepted classification for these phenomena, there is a general agreement concerning their multidimensional nature. The findings with respect to non-hypnotic suggestibility[21] are at best inconclusive, beset with conceptual difficulties as a result of a variety of factors including: vague classification based on differences that are not always meaningful; a lack of test standardisation; and a general paucity of research in this area. The chapter also reviewed research pertaining to suggestion and suggestibility within the 'domain of hypnosis' (Hilgard, 1973), which has been heavily influenced by the 'primary / secondary' suggestibility distinction first conceptualised by Eysenck and Furneaux (1945). The former is claimed to involve behavioural and experiential involuntary responses to

[21] Distinct from the type of suggestibility assessed by hypnotisability scales and suggestions that are typically included within the 'domain of hypnosis' (Hilgard, 1973)

direct verbal suggestion, whilst the latter relates to tendencies such as, gullibility, conformity and compliance. Despite the popular and longstanding belief that hypnosis is only related to 'primary' suggestibility, as championed by Hilgard (1973, 1991), Eysenck and Furneaux (1945) and Evans (1967, 1989), it was argued that the evidence with respects to the independence of hypnosis from other types of suggestibility is far from conclusive, as illustrated by studies on social influence, the placebo response and interrogative suggestibility. In addition it was posited that the relationship between hypnosis and suggestibility was further complicated by the methods used to assess 'hypnotisability', which were deemed not to assess the state of hypnosis or the capacity to develop it, but at best to assess some form of suggestibility (Weitzenhoffer, 2000).

Chapter 2 focussed on examining hypnosis and the principle characteristics of the 'hypnotic state', and although existing theories could account for certain aspects of hypnosis, no single theory could account for the entire range of findings concerning the phenomenon. Indeed the review of the literature revealed no evidence for a unique state of hypnosis. Nevertheless it was argued that different theorists are looking at diverse aspects of the same phenomenon (e.g. social, cognitive, phenomenological, physiological) and consequently the search for a unitary marker of hypnosis is naïve and misguided (Gruzelier, 2000; Woody & McConkey, 2003). In line with Woody and McConkey (2003) and the work of Gruzelier and Crawford (e.g. Gruzelier, 1998; Crawford & Gruzelier, 1992), it was suggested that the dynamic-systems approach (Tart, 1983), which investigates the diversity of states that occur in hypnosis and their patterns across time, rather than a unique signature, would potentially be a useful framework for future research in this area.

In Chapter 3 it was argued that about the only thing one can say about hypnosis-inducing procedures is that in some cases, they appear to cause suggestibility to become enhanced. The data that exists are based on studies in which the same suggestions were given with and without prior induction of hypnosis (e.g. Hull & Huse, 1930; Williams, 1930; Caster & Baker, 1932; Jenness, 1933; Weitzenhoffer & Sjoberg, 1961; Barber & Glass, 1962; Hilgard &

Tart, 1966; Braffman & Kirsch, 1999). These studies typically found that although participants are capable of responding to suggestions in the absence of any formal hypnotic induction, their responsiveness to suggestions may be increased by a small but significant amount by the induction of hypnosis. However, it was further argued that this moderate enhancement in suggestibility as characterised by these studies, is not a true reflection of the efficacy of hypnotic inductions, as the size of the experimental effect has not been considered (Kirsch, 1997). A review and re-analyses of previous work revealed that the effect of the induction of hypnosis on suggestibility was substantial, comparable to psychological treatments in general and medical outcomes. This thesis aimed to delineate the variables subsumed under the label 'hypnotic inductions' that are instrumental to this substantial enhancement in responsiveness to suggestion.

9.2. Key findings

A series of experiments were conducted to establish the relationship between hypnosis and responsiveness to suggestion. More specifically, these studies aimed to investigate which of the independent variables subsumed under the label 'hypnotic induction' were instrumental and which were extraneous. The following elements were identified as characteristic of a typical hypnotic induction:

1. Instructions to become mentally involved or to focus on internal experiences (absorption)

2. Instructions to avoid thinking critically producing a reduction in monitoring, judging and interpreting (reduced critical thought)

3. The explicit labelling of a procedure as 'hypnosis'

4. The initial explicit requests for certain activities and then a subsequent shift to suggesting the same responses

In Chapter 4, as preparation for exploring these elements, a study using a large sample of participants to explore lateral asymmetry in bodily response to suggestions was described. The question of lateralisation of response to suggestion and the notion that one side of the body may be more responsive to suggestion, had important implications for how non-hypnotic and hypnotic suggestibility were measured in this thesis. Given that a third of items on standardised hypnotic suggestibility scales (e.g. SHSS:C, Weitzenhoffer & Hilgard, 1962) involve suggestions with directions for responses on a specific side of the body, it was critical to investigate whether suggestibility as measured by these scales could be a function of whether the suggestion is lateralised. Participants received either an involuntary movement or a motor inhibition suggestion. No significant lateral bias was found for either of the two suggestions regardless of whether the response was defined behaviourally, subjectively or by experienced involuntariness. The findings provided support for those previously reported by Otto-Salaj et al., (1992) and confirmed that there is no lateral asymmetry in bodily response to suggestion. Consequently, lateralised test items contained in standardised hypnotic suggestibility scales continued to be used in subsequent studies, to measure responsiveness to suggestions in both non-hypnotic and hypnotic contexts. The implications of these results for the parallels that have been drawn between symptoms of conversion disorder and phenomena produced in response to suggestions were also discussed (e.g. Babinski & Froment, 1918; Hilgard, 1977; Janet 1907/1929; Kihlstrom, 1992; Oakley, 1999b, 2001).

Having examined the relationship between lateral asymmetry and bodily response to suggestion, the studies reported in Chapters 5 and 6 turned to the nature and role of hypnotic induction itself and explored the notion that absorption and reduced critical thought are instrumental in how inductions exert their influence. In chapter 5 the prediction that the inclusion of instructions for (i) absorption and (ii) reduced critical thought will increase suggestibility independent of any effect produced by the hypnotic context was investigated in a 3 x 2 (condition x context) between-within design study.

The findings reported in Chapter 5 were in line with expectation, with responsiveness to suggestion increasing significantly following the inclusion of instructions for absorption and reduced critical thought. Moreover, instructions for absorption and reduced critical thought increased suggestibility over and above that produced by the hypnotic context alone. The results may be supportive of the idea that states of absorption and reduced critical thought facilitate suggested responding, however, analyses concerning the self-report measures were unable to provide strong evidence that participants' levels of absorption and critical thought were affected by the instructions. Consideration was given to the possibility that the increased suggestibility may have been due to factors unrelated to state changes such as strategy use, expectation and motivation. Nevertheless, self-reported levels of absorption were found to predict behavioural, subjective and experienced involuntariness measures of hypnotic suggestibility regardless of condition.

Chapter 6 examined a wider range of potential relationships between absorption and reduced critical thought in relation to suggestibility, by assessing suggestions for pain modulation. In addition, the association between pain modulation and hypnotic suggestibility was investigated. Based on the results in Chapter 5, it was predicted that changes in responses to suggestions for pain modulation would be significantly greater when instructions for absorption or reduced critical thought were given, compared with instructions for relaxation alone. From the research reviewed in Chapter 6, it was also expected that high hypnotically suggestible participants (HHSp) would show a greater increase in responses to pain modulation suggestion following a hypnotic induction, compared to low hypnotically suggestible participants (LHSp) and medium hypnotically suggestible participants (MHSp).

The findings reported in Chapter 6 are partially consistent with the predictions made. In support of the hypotheses, responsiveness to pain modulation suggestions increased significantly following the inclusion of instruction for absorption, with the increases being over and above that produced by the hypnotic context alone. However, contrary to what

was predicted, responses to pain modulation suggestions did not significantly increase following the inclusion of instructions for reduced critical thought. It was proposed that although such instructions facilitate responding to suggestions found in hypnotic suggestibility scales, they may not be useful for the more clinically oriented suggestions for the control of pain. Consistent with the results reported in Chapter 5, self-reported absorption was significantly associated with changes in responsiveness to pain modulation suggestions. Analyses concerning the self-reported measures and 'typicality' ratings indicate that the increased suggestibility reported may be related to a state of absorption and/or with participants' expectations.

With respect to the effect of hypnotic suggestibility on pain modulation, it was found that responses to pain modulation suggestion in a non-hypnotic context were significantly greater for HHSp in comparison to MHSp, who in turn were significantly more responsive that LHSp. In fact HHSp were more responsive to suggestions than MHSp and LHSp regardless of whether hypnosis was induced or not, which is consistent with the view that responding to 'hypnotic' suggestions is a normal propensity independent of hypnosis per se. It was predicted that HHSp would display the greater increases in responsiveness to pain modulation suggestions, and although responses for HHSp generally did increase following a hypnotic induction, it was found that MHSp were the ones who showed the largest gains from the addition of a hypnotic induction. That is HHSp were very responsive to both non-hypnotic and hypnotic suggestions and their responsiveness was not affected much by the hypnotic induction procedure. In contrast MHSp showed relatively lower levels of responsiveness to non-hypnotic suggestion, and significantly higher levels of response to the same suggestions administered during hypnosis. As discussed in Chapter 6, this emphasises the importance for future studies to include MHSp in their designs, but more importantly may imply that a large percentage of people could benefit from the control and management of pain via hypnotic intervention.

Chapter 7 aimed to systematically investigate the effect that a hypnotic induction has on responsiveness to suggestion and to determine the extent to which the magnitude of this effect is altered by labelling the procedure 'hypnosis'. The results indicated that the hypnotic induction itself produces a moderate increase in responses to suggestions. However, the effect was moderated by whether the induction was labelled 'hypnosis' or 'relaxation'. There were no significant increases in responsiveness to suggestion following the use of a hypnotic induction that was labelled as 'relaxation'. In contrast responsiveness to suggestion increased significantly following the use of the same hypnotic induction that was labelled as 'hypnosis'. These data imply that the extent to which suggestion affects conscious experience appears to depend more on the individual's perception that the context can be identified as 'hypnosis', and on the beliefs and expectations that this raises, then it does on the intrinsic properties of the induction procedure itself.

Chapter 8 focussed on the complex communications, which comprise of suggestions and requests that are often used in a hypnotic context to alter experiences, thoughts and behaviour. Given the common practice of making requests before and during the administering of suggestions, the study reported in this chapter aimed to examine the influence of compliance to requests in a hypnotic context on suggestibility and address the role of strategy selection in responses to suggestion in both non-hypnotic and hypnotic contexts. It was hypothesised that suggestibility would significantly increase, over and above any effect produced by the hypnotic context alone, following compliance to requests to (i) make movements; and (ii) imagine movements. In addition, based on previous research, it was expected that suggested responding would be negatively correlated with planning to wait for a response to occur (wait strategy) and positively correlated with planning to make the suggested response in an attempt to generate the suggested experiences (hot acting strategy).

It was found that compliance to requests had a major effect on responsiveness to suggestion. Requests to make movements had a significant impact on behavioural responses to

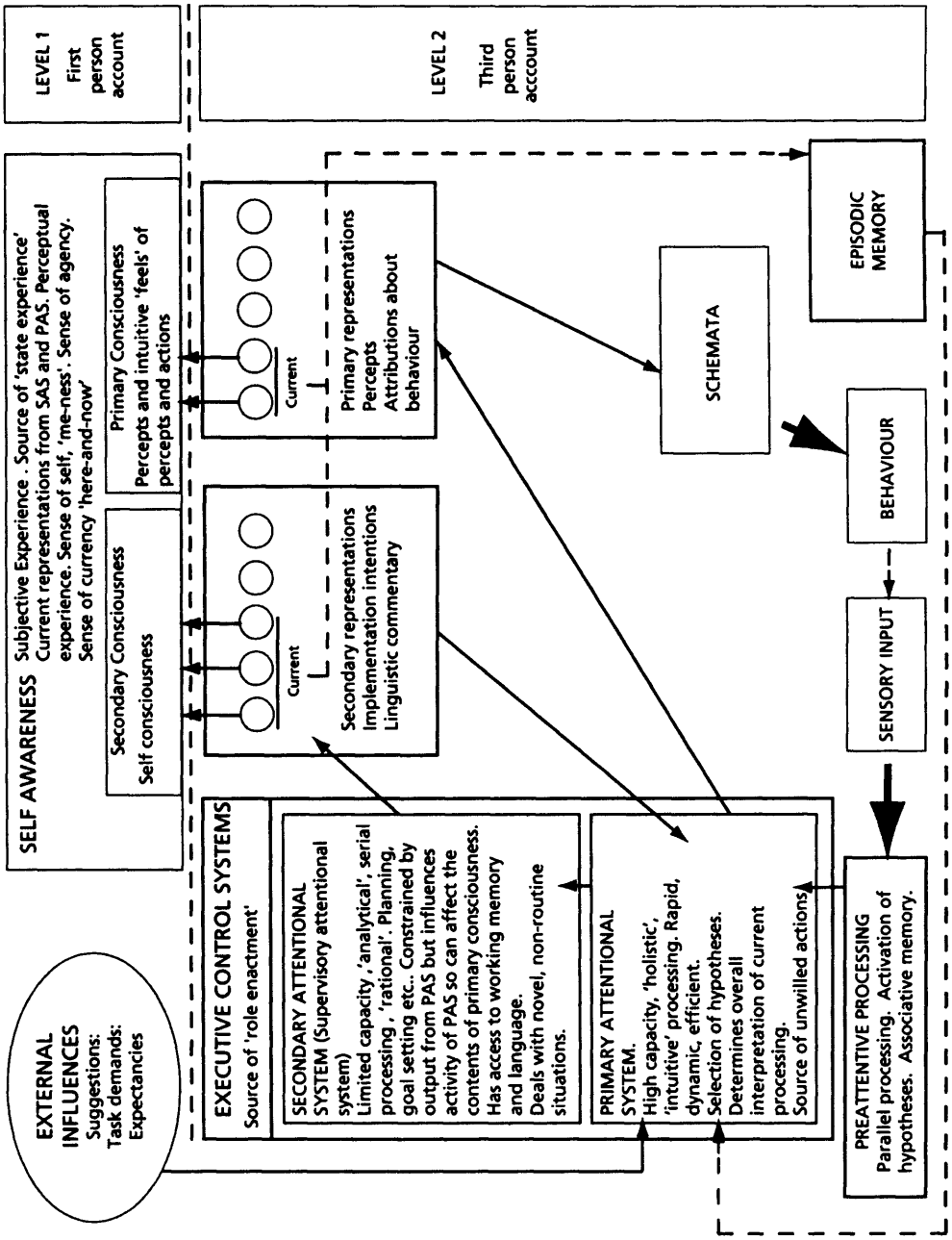
suggestion, whilst requests to imagine movements appeared to affect subjective and involuntariness aspects of responding in addition to the behavioural component. It was also found, in line with expectation that planning to refrain from making responses corresponded to an absence in responding, whereas planning to self-deceive through hot acting was associated with suggested responses.

9.3. General discussion

9.3.1. Putting the findings into context

Examination of a model of brain processing that originated from neuropsychological studies investigating associative learning and memory in animals (Oakley, 1985) and which has been subsequently developed to account for aspects of consciousness and self awareness, (Halligan & Oakley, 2000; Oakley & Eames, 1985), suggestibility (Brown & Oakley, 2004) and phenomena associated with hypnosis and hysteria (Oakley 1999a, 1999b, 2001), help to place the results presented here into context (also see Chapter 5). The essential features of this model as it relates to the present results are shown in Figure 9.1. Following a preattentive stage of processing, a centralised executive structure (the Primary Attentional System - PAS), samples the resultant processing hypotheses and selects the best-fitting ones in the light of previous experience to create primary representations that can form the basis for action. In routine situations the selected primary representations automatically activate related cognition and action schemata and lead to behaviours that are executed rapidly, efficiently and without volitional effort.

Figure 9.1. A heuristic model of information processing showing the relationship between underlying processes (level 2) and subjective experience (level 1). See text for further explanation (modified from Brown & Oakley, 2004; Oakley, 1999a, 1999b, 2001)



These PAS control processes correspond to contention scheduling in the model proposed by Norman and Shallice (1986). Where the existing knowledge base is inadequate to specify appropriate action schemata, in novel situations for example, a higher level secondary attentional system (SAS), similar to the supervisory attentional system of Norman & Shallice (1986), exercises planning and goal setting capacities to create secondary

representations from the representations (hypotheses) provided by the PAS. Secondary representations can then achieve behavioural output via their influence on the PAS.

In this model those primary and secondary representations that are selected through the action of the SAS, as being relevant at any one time to the primary goal of the individual, form the content of subjective experience. The term 'Level 1' is used to refer to the subjective accompaniments of processing and 'Level 2' refers to the brain processes that underlie them.

The model assumes that the mechanisms of suggestion in hypnosis and outside it are fundamentally the same. The results presented in this thesis support this view, demonstrating consistently high correlations between responses to non-hypnotic and hypnotic suggestions and strong evidence that many individuals can produce 'hypnotic' phenomena in response to suggestion without an induction. Suggestions are seen as external influences that serve to raise the likelihood of a particular hypothesis being selected by the PAS as the basis for the generation of primary representations. Once selected by the PAS the suggested hypothesis (or 'rogue representation') is capable of evoking a brain state comparable to that of the suggested effect. In the perceptual domain this could result in a non-veridical sensory experience or the loss of awareness of a sensation that is physically present. Appropriate suggestions may also result in the direct elicitation of a motor response, such as arm levitation, which is experienced as involuntary. Alternatively the rogue representation may invoke the inhibition of an intended motor output, such as limb paralysis.

The model posits that suggestions may have their effect directly at the level of the PAS ('concentrative' responding) or indirectly via the SAS ('constructive' responding)[22]. Within this framework, (a) the inclusion of instructions to become absorbed and reduce critical

[22] As Brown and Oakley (2004) point out, although a distinction in styles of responding is made, it is likely that these styles overlap in practice, with some individuals adopting one style under some circumstances and another in a different situation.

thought[23]; (b) compliance to requests; and (c) the label 'hypnosis' may enhance suggestibility by increasing the likelihood of a suggestion being acted upon (i.e. of a rogue representation being selected by PAS). A state of absorption and reduced critical thought may maximise the representation activation produced by the words of the suggestions, and consequently be a key component of the concentrative response style (Brown & Oakley, 2004). However, as discussed in Chapters 5 and 6, absorption and a reduction in critical thought may facilitate responsiveness to suggestion by increasing the use of strategies, and consequently may also facilitate constructive responding. Compliance to requests may enhance the use of SAS strategies such as engaging in goal-directed imaging, which would influence PAS activity and therefore suggested responding. Indeed the findings in Chapter 8 encompass the notion of constructive responding, revealing that planning to make the suggested responses in addition to attempting to produce the suggested experience (hot acting strategy) were correlated positively and most reliably with suggested responding. In this model the label 'hypnosis' can be seen as a suggestion that activates existing preattentive representations about hypnosis, leading to the selection by the PAS of hypotheses that influence an individuals experience in the 'hypnotic' situation both directly and via subsequent representation in SAS. Important among these may be beliefs about the involuntariness of responding. In particular the label 'hypnosis' may serve as a meta-suggestion that the effects of suggestion are enhanced following 'hypnotic' induction procedures.

The results reported in this thesis are consistent with this model, which provides a framework that accommodates both 'state' and 'non-state' perspectives of hypnosis, with both hypnotic procedures and suggestion operating at the level of the executive control systems. From the 'generic state' position, a 'real' subjective state-change is felt at Level 1, as

[23] Although instructions for a reduction in critical thought had no effect on responsiveness to pain modulation suggestions, and was unable to predict changes in responsiveness to suggestion, it is important to note that absorption and reduced critical thought may be viewed synergistically and its conceivable that they reflect different aspects of the same cognitive processes (i.e. increased absorption may subsequently lead to less critical thought).

reflected by what the individuals concerned report of their experience. From the 'generic non-state' stance, the phenomena and the accompanying subjective experiences are the products of social influence and implicit perceptions of the role requirements during hypnosis as they are enacted at Level 2.

9.3.2. So what of suggestion and hypnosis?

9.3.2.1 The effect of hypnosis on responses to suggestion – anything new?

Hypnotic inductions are procedures intended to elicit hypnotic phenomena that precede clinical interventions and test suggestions contained in standardised hypnotic suggestibility scales (Edmonston, 1991). However, data on the nature and role of hypnotic induction procedures is surprisingly lacking, and as argued throughout the thesis probably the only thing one can say about them with any conviction is that they enhance suggestibility in some cases. The present body of work approached the relationship between hypnosis and suggestion from an objective standpoint, by measuring and comparing responses to suggestion without a hypnotic induction with responses to the same suggestions following a hypnotic induction.

The considerations raised in this thesis indicate that multiple factors within the psychosocial context and within the experience of subjects influence the alterations of cognition and sensation brought about by suggestion. The effect of individual factors on responses to various types of 'hypnotic' suggestion has received little explicit recognition in the general literature. However, the investigations reported here help identify the relative influence of elements of hypnosis, or more correctly existing hypnosis-inducing procedures, have on responses to suggestion. Taken together, the findings reveal that the essential elements of induction procedures are the definition of the situation as hypnotic which in turn enhances the expectation of benefits; the focussing of attention and the reduction of critical thought; and the facilitation of engaging in goal-directed behaviours through compliance to requests.

Although the results presented here are consistent with the notion that hypnotic phenomena can be suggested successfully without a prior induction procedure, the fact remains that hypnotic induction procedures do increase suggestibility substantially. Between 60 – 94% of participants that received (a) instructions to become absorbed or reduce their critical thought or (b) requests to make or imagine movements, experienced an increase in responsiveness to suggestion. These increases in responses to suggestion were significantly greater than those participants that received relaxation instructions in a hypnotic context, of which between only 23-40% experienced an increase in suggestibility. Similarly between 60-80% of participants that received an induction labelled 'hypnosis' experienced an increase in suggestibility, in comparison to only 23-40% of participants that received the same induction but labelled 'relaxation'. Consequently, if these elements can be reasonably and plausibly applied to an appropriate clinical or experimental procedure that employs suggestion to achieve its effects, then they should be used. Identification and knowledge of these factors can be more directly and optimally utilised by both patients and health care providers, thus providing an impetus to the development of improved therapeutic techniques.

Another key contribution of the body of work reported here was the quantification of the effect of hypnotic inductions and the elements that characterise them. Previous research has typically described the increase in suggestibility produced by hypnotic inductions as being small but significant (e.g. Barber & Glass, 1962; Braffman & Kirsch, 1999; Hilgard & Tart, 1966; Weitzenhoffer & Sjoberg, 1961). It was argued that the examination of mean differences was not a true reflection of the efficacy of hypnotic inductions, as the size of the experimental effect had not been examined and that effect sizes would be a more accurate way of determining the relative magnitude of the effect of hypnotic inductions (Kirsch, 1997). On examination of effect sizes, the 'true' effect of hypnotic inductions and the essential elements that they are comprised of (as identified above) on responses to suggestion was found to be very substantial indeed.

The measurement of experienced involuntariness is a distinguishing feature of the research presented here and one of its major strengths. The experience of involuntariness is often cited as one of the hallmarks of a response to a suggestion (Lynn et al., 1990; Weitzenhoffer, 1953, 2000). Weitzenhoffer claims a necessary (although not sufficient) condition for a communication to be termed a suggestion is that the suggested behaviours and experiences are accompanied by a feeling of involuntariness (i.e. the 'classic suggestion effect'). Unfortunately, the measurement of experienced involuntariness has frequently been ignored, resulting in individuals being credited for responses to suggestion, which they did not actually demonstrate (Weitzenhoffer, 2002). This is one of the most significant weaknesses of previous studies, that has been remedied in those reported in this thesis.

Hypnotic inductions increase responsiveness to suggestions. This was already known, but what was not known was which variables subsumed under the label 'hypnotic induction' were instrumental to this increase and just how great this increase was. That is the foremost contribution of this thesis.

9.3.2.2. Suggestion and hypnosis – one and the same?

A key underlying premise of this thesis is that hypnosis and suggestion are not one and the same and that suggestibility is not hypnotisability. Unfortunately many researchers do not differentiate between suggested effects and those specific to the hypnotic state. For example, in the recent special issue of the International Journal of Clinical and Experimental Hypnosis on brain imaging and hypnosis, Killeen and Nash (2003) include the following definition of a hypnotic procedure that was put together by those attending the University of Tennessee Brain Conference:

> 'A hypnotic *procedure* is a protocol used to establish a hypnotic situation and evaluate responses to it. In such situations one person (the *subject*) is guided by another (the *hypnotist*) to respond to suggestions for alterations in perception, thought, and action. If the constellation of responses to standardized suggestions satisfy a criterion, we

> infer that the procedure induced a hypnotic *state*. Hypnotic *responses* are those responses and experiences characteristic of the hypnotic state' (p. 208).

There are two fundamental flaws with this definition. Firstly, the definition relies on circular reasoning. If the presence of a 'hypnotic state' is to be inferred from a 'constellation of responses to standardised suggestions' the 'hypnotic state' cannot in turn be used to explain responsiveness to suggestion. Secondly, responsiveness to suggestion as an index cannot tell us for certain whether an individual is hypnotised or not. This definition highlights the two main components of hypnosis – 'trance' and 'suggestion' (Heap and Aravind, 2002). Unqualified suggestibility has traditionally been considered a sign of hypnosis. However, no matter how many other so-called signs of hypnosis are observed (e.g. dilation of the pupil; spontaneous amnesia; trance logic, fixity of gaze; alteration of the sense of time – see Weitzenhoffer 2000, for a comprehensive list of 'objective' and 'subjective' signs that have been associated with hypnosis), if suggestibility is absent, none of the typical phenomena of hypnosis (e.g. amnesia, hallucinations, analgesia) are produced.

As has been continually repeated throughout this thesis, there is no evidence as of yet for a 'discrete state' or 'discrete states' of hypnosis, involving unique patterns of psychological structures. Although a 'trance' state without suggestibility is possible, given that this would have little effect without specific suggestions for altered perception, could this 'trance' state be called hypnosis? – perhaps not, but that would be a matter for debate if such a trance 'state' were eventually to be identified. However, as the review of suggestion in Chapter 1 revealed, suggestibility is not unique to hypnosis, and therefore it seems *equally* plausible that no matter how central suggestion is to the production of so-called hypnotic phenomena, hypnosis may not be unique to suggestibility. Nevertheless, suggestibility has been the only feature that has been intimately associated with hypnosis that can be objectively and more or less numerically assessed. Assessment of hypnosis and the capacity to develop it beyond suggestibility remains practically non-existent, with the exception of the Field Inventory (Field, 1965) and the Phenomenology of Consciousness Inventory (PCI;

Pekala, 1991b), which measure the depth of hypnosis but do not make direct use of suggestibility. However, the validity of such scales is usually established on how well their measures correlate with measures of suggestibility obtained from the Stanford scales and as Weitzenhoffer (2002) points out there are no good reasons for believing that the assessment of the hypnotic state should necessarily also measure suggestibility. The 'hypnotic state' may perhaps only be clearly detected with ultra responsive individuals, so-called 'virtuosos', and it is these individuals that may be able to provide the basis of a specific index of hypnosis beyond suggestibility. The experiential approach developed by Price and Barrell (1980), which utilises the first-person and third person perspectives to discover the common dimensions and interrelationships within specific types of experiences, provides a potentially useful paradigm to develop such an index.

The thesis also raises the question of whether there is a distinction between non-hypnotic and hypnotic suggestibility. The current work adopted Kirsch's distinction between suggestibility, hypnotic suggestibility and hypnotisability. Suggestibility and hypnotic suggestibility are defined as responsiveness to suggestion in non-hypnotic and hypnotic contexts respectively. Hypnotisability, on the other hand, is defined as the change in suggestibility following a hypnotic induction procedure. The distinction between non-hypnotic and hypnotic suggestibility typically rests on the use of a procedure called hypnosis. Both Kirsch (1997) and Wagstaff (1998a) have raised the possibility of eliminating this distinction. According to Kirsch (1997) 'hypnosis could be defined as responding to suggestions used in hypnotisability scales, regardless of whether an induction has been used'. (p. 221). Wagstaff (1998a) on the other hand proposes that 'we consider 'hypnosis' not as something in a separate category from suggestion, but rather as *a suggestion in itself* ... [a] suggestion *that one is entering a special state or condition called hypnosis*' (p. 160).

9.3.3. Future directions

Increasingly, discussion is turning to the effects of the clinical efficacy of hypnosis as an adjunct to psychological and pharmacological therapies, as well as its cost-saving role in healthcare. Future work needs to identify, which individuals will benefit from the addition of hypnosis to a clinical protocol and which individuals would be served better by therapeutic suggestions in a non-hypnotic context. The finding that medium hypnotically suggestible individuals appear to significantly benefit from a hypnotic induction, whilst high and low hypnotically suggestible individuals seem to be as responsive to hypnotic suggestions as they are to non-hypnotic suggestions may provide a useful starting point. However, previous research indicates that hypnotic suggestibility is not always a very good predictor of treatment outcome and even when a relationship is found, as with pain modulation, it is usually relatively modest (e.g. Bates, 1993; Hilgard & Hilgard, 1994; Kirsch, 1999; Patterson & Jenson, 2003).

Suggestibility has been measured in this thesis, with the exception of one study, using standardised hypnotic suggestibility scales. A possible avenue for future exploration would be to use other types of suggested effects within the 'domain of hypnosis' (Hilgard, 1973) that are not reflected in these scales but play an important part in applied clinical and medical settings. The study reported in Chapter 6 used suggestions for pain modulation, which is a good example of a practical use of hypnosis (i.e. pain management) that is not reflected in the test items used in standardised scales. Other examples include, specific suggestions to modulate attention, intentionality and awareness of control and suggestions for behaviours that mimic more closely the symptoms of conversion and dissociative disorders, such as paralysis and blindness. Research of this sort would help elucidate the relationships between induction procedures and suggestibility that are of clinical relevance and can increase the efficacy of hypnosis as a clinical and experimental tool.

Unfortunately, over the last 300 years hypnosis has been associated with limitless bizarre and extraordinary ideas and practices such as occultism, magic, and pseudo-science, which are responsible for many of the negative attitudes people have towards it. As a consequence of this, any treatment associated with hypnosis may be refused by funders of health care or by the proposed client. However, as Kirsch (1999) points out, hypnosis is an adjunct to therapy rather than a treatment, and the findings reported here indicate that the addition of a hypnotic induction procedure could improve treatment outcome. This will be particularly true for suggestive and imagery-based therapies for many different conditions that have psychological, functional or psychosomatic components, such as chronic and acute pain, eating disorders, anxiety disorders and dissociative disorders. Equally, elements such as instructions to become absorbed, focus on internal experiences and avoid thinking critically could easily be incorporated into cognitive behavioural therapies, without the hypnosis label. Future research could investigate whether the instrumental elements identified in this thesis to characterise hypnotic induction procedures, are able to increase responsiveness to suggestion when used in a non-hypnotic context. This may lead to knowledge about, and identification of, the factors that optimally influence responses to non-hypnotic suggestions, thus improving therapeutic techniques for both patients and health care providers.

Finally it is important to reiterate the proposal that future work should, in the first instance at least, treat suggestion and hypnosis separately. We need to determine if there is more to hypnosis than suggestion. The physiological and neurological evidence that could be provided by neuroimaging could potentially answer this question. With the upsurge in interest in the use of hypnosis as a tool to study cognitive phenomena, it becomes increasingly more important to establish whether: (i) there are 'discrete states' of hypnosis involving patterns of psychological structures; and (ii) the experiences produced in hypnosis (i.e. after a hypnotic induction) by suggestion, are dependent on this hypothetical 'trance' state. Only two neuroimaging studies (Rainville et al., 1999; Rainville et al., 2002) have directly addressed the status of hypnotic states, without confounding the effects of 'hypnosis' with the effects of specific suggestions. Both these studies identified and

characterised hypnosis as involving changes in brain activity within regions involved in the control of consciousness states, such as the brainstem, the thalamus and the anterior cingulate cortex, as well areas such as the ventrolateral frontal and right posterior parietal cortices which have been shown to regulate attentional processes through the mechanisms of executive attention. At present, although there is emerging evidence that hypnosis can be understood in terms of known attentional processes and brain systems, we still do not know about its necessity or if suggested effects that occur prior to a hypnotic induction are represented differently in the brain compared to suggested effects following a hypnotic induction. Based on the strong correlation between suggestibility in the two contexts, it seems likely that hypnotic and non-hypnotic suggestions are governed by the same causal mechanisms. In fact, Hull wrote over 70 years ago that there is 'no phenomenon [that] can be produced in hypnosis that cannot be produced to lesser degrees by suggestions given in the normal waking condition' (Hull, 1933, p. 391). Neuroimaging data on the effects of suggestion without hypnosis could help definitively establish the cognitive and neuropsychological mechanisms that underlie hypnosis and suggestion, which is important if research on hypnosis and suggestion is to contribute meaningfully to the growth of the cognitive neurosciences and psychology in general.

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Appendices

Appendix 4.1

Instructions and Suggestions for Involuntary Movement and Motor Inhibition

Instructions A and suggestions for arm lightness/raising

'Good, just sitting comfortably, with your eyes closed and your hands resting easily on your legs begin to relax as much as you can and breathe easily and regularly. In a moment or two you will hear some suggestions relating to the feelings you have in your hands and arms. I would like you to concentrate on these suggestions and to think along with them. Absorb yourself in them. Do not try and analyse your thoughts or feelings... the more you are able to just let yourself go along with the instructions the easier it will be to experience what is being suggested. Nothing that you will be asked to experience or do will be embarrassing or harmful in any way. In fact most people simply find this a very relaxing and interesting experience. Just breathing easily and regularly and continuing to listen to the tape.'

'Continue to relax – breathing easily and gently. In a moment I will ask you to focus on your hands and to pay attention to particular feelings in one of them... feelings of lightness and a feeling that that hand wants to move upwards all by itself, easily and without effort.'

'Please be aware of the sensations in your two hands and notice perhaps that one them is feeling slightly different. A small tingle maybe or a feeling of pressure, a twitch of a muscle or some other feeling which tells you that particular hand is becoming lighter and lighter and is wanting to move upwards all by itself. Just beginning to want to move... move upwards as it feels lighter... and lighter... Your hand moving upwards... The whole arm becoming lighter and wanting to move upwards... Up and up... Moving up a little at first and then higher and higher as it gets lighter and lighter... just moving up and up... higher

and higher... easier and easier without any effort all by itself. Up and up. Up and up. That hand and arm just feeling lighter and lighter right up to your shoulder, and rising upwards... bit by bit... up and up... all by itself. Just moving up and up, lighter and lighter, higher and higher. And once you feel that hand beginning to move, just allow the movement to continue... up and up easily and comfortably, all by itself. The hand and arm moving up and up, higher and higher. More and more. Just moving upwards, lighter and lighter, up and up until it reaches a comfortable position as high as it can go just at the moment... up and up...up and up...higher and higher...and just allowing your hand to remain in that position easily and comfortably for a moment or two longer'.

[Experimenter completes the observer's scale on the basis of what has happened up to this point and where the hand is now]

'Good and now that hand and arm beginning to feel normal again... just like the other one back to its normal weight and moving back from wherever it now is to rest comfortably back on your leg. Just returning to normal feeling and returning to its resting position. When both hands are resting comfortably on your legs again wiggle the fingers in both hands if you wish... to make sure they feel exactly the same... and then when you are ready just open your eyes... still feeling relaxed and comfortable and completely back to normal wide awake feelings.'

Instructions B and suggestions for arm heaviness/immobility

'Good, just sitting comfortably, with your eyes closed and your hands resting easily on your legs begin to relax as much as you can and breathe easily and regularly. In a moment or two you will hear some suggestions relating to the feelings you have in your hands and arms. I would like you to concentrate on these suggestions and to think along with them. Absorb yourself in them. Do not try and analyse your thoughts or feelings... the more you are able to just let yourself go along with the instructions the easier it will be to experience what is being suggested. Nothing that you will be asked to experience or do will be embarrassing or

harmful in any way. In fact most people simply find this a very relaxing and interesting experience. Just breathing easily and regularly and continuing to listen to the tape.'

'Continue to relax – breathing easily and gently. In a moment I will ask you to focus on your hands and to pay attention to particular feelings in one of them, feelings of heaviness and a feeling that that hand could not move upwards without a great deal of difficulty and effort.'

'Please be aware of the sensations in your two hands and notice perhaps that one of them is feeling slightly different. A small tingle maybe or a feeling of pressure, a twitch of a muscle or some other feeling which tells you that particular hand is becoming heavier and heavier and is wanting to remain exactly where it is. Just becoming less and less able to move as it feels heavier... and heavier... Your hand becoming more and more unwilling to move... the whole arm becoming heavier and losing its ability to move... Sinking down heavier and heavier... Like a lead weight, as it rests against your leg... as it gets heavier and heavier... just too heavy to move... feeling like it could not be moved up no matter how hard you tried... just lying loose and heavy. That hand and arm just feeling heavier and heavier right up to you shoulder and resting heavily... little by little... more and more difficult to move... even if you tried. A feeling that the harder you tried the heavier and heavier the hand and arm would be... and less and less able to move... heavy... immobile. And once you feel that hand becoming unable to move just feel it ignoring any attempt to move it upward. Just try to life that heavy, immobile hand now and just feel how difficult it would be to move it more than a small amount... and maybe it will not even move at all. Keep trying now until that hand has moved as much as it can just at the moment or until you want to stop trying altogether... heavier and heavier... more and more immobile... just allowing your hand to remain in that position easily and comfortably for a moment or two longer'.

[Experimenter completes the observer's scale on the basis of what has happened up to this point and where the hand is now]

'Good and now that hand and arm beginning to feel normal again... just like the other one back to its normal weight and moving back down from wherever it now is to rest comfortably back on your leg. Just returning to normal feelings and returning to its resting position. When both hands are resting comfortably on your legs again wiggle the fingers in both hands if you wish... to make sure they feel exactly the same... and then when you are ready just open your eyes... still feeling relaxed and comfortable and completely back to normal wide awake feelings.'

Appendix 4.2

Scoring for Arm Levitation and Arm Immobility Suggestions

Arm levitation sample

****Behavioural response** to be recorded by the Experimenter**

1. In response to the suggestion of arm lightness/upward movement:

Which hand moved 4 inches or more?

Left Right Both Neither (circle one)

****Subjective and experienced involuntariness responses** to be recorded by the Participant**

2. When it was suggested that one of your hands would begin to *feel lighter and feel like it was beginning to move upwards* which hand did you get that feeling in?

Left Right Both Neither (circle one)

3. During this suggestion, how voluntary did the movement feel? (circle a number)

Completely voluntary I moved it myself	1	2	3	4	5	Completely involuntary Felt like it moved by itself

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Arm immobility sample

***Behavioural response* to be recorded by the Experimenter**

1. In response to the request to *try to move the 'heavy' hand/arm* after the suggestion of heaviness/no movement:

Which hand moved and by no more than 1 inch?

Left Right Both Neither (circle one)

***Subjective and experienced involuntariness responses* to be recorded by the Participant**

2. When it was suggested that one of your hands would begin to *feel heavier and feel unable to move* which hand did you get that feeling in?

Left Right Both Neither (circle one)

3. During this suggestion, how voluntary did not moving or moving with difficulty feel? (circle a number)

Completely voluntary I could have moved it easily if had tried	1	2	3	4	5	Completely involuntary Felt like I could not move it easily even if I tried

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Appendix 4.3

Handedness Questionnaire (Coren, 1992)

Simply read each of the questions below. Decide which hand you use for each activity and then put a check mark next to the answer that describes you the best. If you are unsure of any answer, try to act it out to see which hand you are using.

Indicate hand preference:	LEFT Hand	RIGHT Hand	EITHER Hand
1. With which hand do you normally write?			
2. With which hand do you draw?			
3. Which hand would you use to throw a ball to hit a target?			
4. In which hand do you hold a tennis racket?			
5. With which hand do you use your toothbrush?			
6. Which hand holds a knife when you are cutting things?			
7. Which hand holds a hammer when you nail things?			
8. In which hand would you hold a match to strike it?			
9. In which hand would use an eraser on paper?			
10. Which hand removes the top card when you are dealing from a deck?			
11. Which hand holds the thread when you are threading a needle?			
12. In which hand would you hold a fly swatter?			

Count the number of 'left', 'right' and 'either' responses. Your score is the number of rights multiplied by 3, plus the number of eithers multiplied by 2 plus the number of lefts. For convenience fill in the following:

Number of RIGHT responses x 3 =
Number of EITHER responses x 2 =
Number of LEFT responses =
Total =

33 to 36 = Strongly Right-Handed
29 to 32 = Moderately Right-Handed (mixed right-handed)
25 to 28 = Weakly Right-Handed (mixed right-handed)
24 = Ambidextrous
20 to 23 = Weakly Left-Handed (mixed left-handed)
16 to 19 = Moderately Left-Handed (mixed left-handed)
12 to 15 = Strongly Left-Handed

Appendix 5.1

Suggestibility Scale Constructed by Brown et al., (2001)

This scale can be administered with and without a hypnotic induction procedure. It consists of eight test-suggestions taken from the Barber Suggestibility Scale (BSS: Barber, 1965), the Carleton University Responsiveness to Suggestion Scale (CURSS: Spanos, Radtke, Hodgins, Stam & Bertrand, 1983), the Stanford Hypnotic Susceptibility Scale, form C (SHSS:C: Weitzenhoffer & Hilgard, 1962) and the Creative Imagination Scale (CIS: Barber & Wilson, 1979).

Participants were initially presented with this suggestibility measure in the absence of any formal instructions or mention of hypnosis. They then received the same suggestions in a hypnotic context.

In the *non-hypnotic context* the suggestions were preceded by the following instructions, adapted from the instructions used by Braffman and Kirsch (1999):

'In this part of the study, we want to assess your ability to experience various things that will be described to you on this audiotape/cd. Your ability to experience them depends largely on your willingness to be receptive to ideas and to allow these ideas to act upon you without interference. So all you need to do it close your eyes and try to experience what will be described to you.'

In the *hypnotic context* the suggestions were preceded by the following instructions:

'In this second part of the study, we want to assess your ability to experience the same suggestions, only this time we will ask you to experience them whilst in hypnosis. So in this version, the suggestions be preceded by a hypnotic induction to help you become hypnotised'.

The hypnotic context was *terminated* by the following instructions, adapted from the CURSS:

'You're going to come out of hypnosis in a few minutes... when you do... you'll feel refreshed... wide awake... and in a good mood... I will count from five to one... and with each count you will be more fully awake... five... starting to wake... four... more and more awake... three still more and more awake... two... becoming more and more awake... one... more awake... open your eyes... wide awake.'

Test-suggestions

1. Arm levitation (BSS)

'Please hold your left arm straight out in front of you at shoulder height, with the palm of you hand facing down. Your left arm straight out in front of you, the palm down. Concentrate on your arm and listen to me. Imagine that the arm is becoming lighter and lighter... that it's moving up and up ... It feels as if it doesn't have any weight at all... and it's moving up and up... more and more... It's as light as a feather... it's weightless and rising in the air... It's lighter and lighter... rising and lifting... more and more... It's lighter and lighter... and moving up and up... It doesn't have any weight at all... and it's moving up and up... more and more. It's lighter and lighter... moving up and up... more and more... higher and higher.' (Allow 10 seconds)

'You can relax your arm now.'

2. Hand lock (BSS)

'Please keep your eyes closed and clasp your hands together tightly and interlace the fingers. Press your hands together, with palms touching. Put them in your lap. Concentrate on your hands and hold them together as tightly as you can. Imagine that your hands are two pieces

of steel that are welded together so that it's impossible to get them apart. They're stuck... they're welded... they're clamped... When I ask you to pull your hands apart they'll be stuck and they won't come apart no matter how hard you try... They're stuck together... they're two pieces of steel welded together... You feel as if your fingers were clamped in a vise... Your hands are hard... solid... and rigid! The harder you try to pull them apart the more they will stick together! It is impossible to pull your hands apart! The more you try the more difficult it will become. Try... you can't.' (Allow 5 seconds)

'Try harder... you can't.' (Allow 10 seconds)

'You can unclasp your hands now.'

3. Thirst 'hallucination' (BSS)

'Imagine that you've just finished a long, long walk in the hot sun... You've been in the hot sun for hours... and for all that time you haven't had a drink of water... You've never been so thirsty in your life... You feel thirstier and thirstier... Your mouth is parched... your lips are dry... your throat is dry... You have to jeep swallowing and swallowing... You need to moisten your lips.' (Allow 3 seconds)

'You feel thirstier and thirstier... drier and drier... Thirstier and thirstier... dry and thirsty... You're very, very thirsty! Dry and thirsty! Dry and thirsty!' (Allow 10 seconds)

'Now imagine drinking a cool, refreshing glass of water.' (Allow 5 seconds)

4. Arm rigidity (CURSS)

'Please hold your left arm straight out in front of you at shoulder height... Notice that your arm feels slightly numb and that it is beginning to feel tight. Your arm feels tighter and tighter... It is becoming stiff and tight... stiff and rigid... Imagine that your arm is in a splint so that the elbow will not bend... A tightly splinted arm cannon bend... Your arm

feels stiff and rigid... solid and rigid... it feels stiff... rigid... and unable to bend... In fact, your arm feels so stiff and so rigid that it won't bend... Test how stiff and rigid it is. Try to bend your arm.' (Allow 10 seconds)

'Ok, that's fine, your arm no longer feels stiff or rigid. You can once again bend it easily. Just let it relax and replace it in your lap.'

5. Hand repulsion (CURSS)

'Now please extend both of your arms straight out in front of you at shoulder height with palms facing one another... and with the finger tips of one hand touching the finger tips of the other... Pay close attention to your hands... Notice the sensations that you feel in your hands... warmth... tingly feelings... and a little heaviness... Notice also that your hands are beginning to separate and move apart... Your hands are moving further and further apart... further and further apart... Your hands feel like two magnets repelling each other... they feel as though they are being forced apart... further and further apart... wider apart... moving further and further apart.' (Allow 10 seconds)

'Ok, that's fine... just put your arms back in your lap and let them relax.'

6. Music 'hallucination' (CIS)

'Please keep your eyes closed. Now think back to a time when you heard some wonderful, vibrant music... it could have been anywhere ... and by thinking back you can hear it even more exquisitely in your own mind... You make it yourself... and you can experience it as intensely as real music... The music can be absolutely strong... exquisite... vibrating though every pore of your body... going deep into every pore... penetrating though every fibre of your being... The most beautiful, complete, exquisite, overwhelming music you ever heard... Listen to it now as you create it in your own mind.' (Allow 15 seconds)

'You may stop thinking of the music now.'

7. Arm immobilisation (CURSS)

'Please place your right forearm on the table in front of you with the palm of your hand facing down. Concentrate on your hand and arm. Notice that they are beginning to feel heavy... very... very heavy... Imagine that very heavy weights have been placed on your hand and arm... the weights are very heavy... and they pin you hand and arm to the table in front of you... The weights are very heavy... and they make your hand and arm feel very heavy... very... very heavy... In fact, your hand and arm feel so heavy and so weighted down that you won't be able to lift them from the table... Your hand and arm feel heavy... very... very heavy... much too heavy to lift from the table... too heavy even to move... Test how heavy your hand and arm are... Try to lift your hand and arm from the table.' (Allow 10 seconds)

'Ok, that's fine... your hand and arm no longer feel very heavy... and you can now lift them without difficulty... Let your hand and arm relax and replace them in your lap.'

8. Taste 'hallucination' (SHSS:C)

'I want you to think of something sweet in your mouth. Imagine that you have something sweet tasting in your mouth, like a little sugar... And, as you think about this sweet taste, you can actually begin to experience the sweet taste... It may at first be faint, but it will grow... and grow... Now, you begin to notice a sweet taste in your mouth... The sweet taste is increasing... sweeter... and sweeter... It will get stronger. It often takes a few moments for such a taste to reach its full strength... It is now getting stronger... stronger.' (Allow 10 seconds)

'All right. Now notice that something is happening to that taste. It is changing. You are not beginning to notice a sour taste in your moth... an aid taste, as if you had some lemon in your mouth, or a little vinegar... The taste in your mouth is getting more and more sour... more acid... more and more sour.' (Allow 10 seconds)

'All right. Now, the sour taste is going away, and your moth feels just as it did before I mentioned any taste at all. Your mouth is normal now. There, it's quite normal now, and you just continue to relax... more and more relaxed.'

Appendix 5.2

Scoring Booklet for Brown et al.'s (2001) Suggestibility Scale

This assessment form is to be completed by the experimenter. *Behavioural scores* were measured in a dichotomous fashion for each suggestion. *Subjective scores* were taken for all suggestions. *Experienced involuntariness scores* were taken for each item for which the participant obtained a score on the behavioural assessment (including the half-point on the hand-lock item), with the exception of the thirst, taste and music hallucinations for which involuntariness scores were taken irrespective of a behavioural response score.

Assessment Form

Condition: Consent form completed? Y / N

Subject number: _____

Age: _____ Sex: M / F

Test 1: Behavioural

1. Arm Levitation	score rise > 4 inches	0 / 1
2. Hand Clasp	half if hands together after 5 sec one if hands together at end	0 / ½ / 1
3. Thirst Hallucination	score clear mouth movements, swallowing etc...	0 / 1
4. Arm Rigidity	score is ppt. does not bend arm	0 / 1
5. Hand Repulsion	score if hands more than 4 inches apart	0 / 1
6. Music Hallucination	score clear head nodding	0 / 1
7. Arm Immobilisation	score if ppt. does not lift arm more than 3 inches	0 / 1
8. Taste Hallucination	score clear indication of sweet taste (e.g. smile, licking lips) or sour taste (e.g. grimace)	0 / 1

TOTAL BEHAVIOURAL SCORE: / 8

** For those items that participants score either half or one, ask for involuntariness scores. Take involuntariness scores for items 3, 6 and 8 regardless**

Test 1: (i) Involuntariness; (ii) Subjective

1. Arm Levitation

At first you were told that your arm was getting lighter and rising in the air. Your arm did rise. Would you say that your arm felt as though it was rising by itself or did you raise it on purpose? (score involuntary) 0 / 1

On a scale of 1 to 10, to what extent did your arm feel as though its was light? / 10

2. Hand Clasp

You were then told that you couldn't take your hands apart because they were welded together. You didn't take your hands apart. Did you feel as though you *couldn't* take them apart or would you say you kept them together to go along with the test? (score couldn't) 0 / 1

On a scale of 1 to 10, to what extent did your hands feel as though they were stuck together? / 10

3. Thirst Hallucination

You were then told that you were very thirsty because you'd been on a long, hot walk in the Sun. Would you say you felt thirstier during the suggestion than before? (score affirmative) 0 / 1

On a scale of 1 to 10, how thirsty did you feel? / 10

4. Arm Rigidity

You were then told that you couldn't bend your arm because it was in a splint. You didn't bend your arm. Did you feel as though you *couldn't* bend it or would you say you didn't bend it to go along with the test? (score couldn't) 0 / 1

On a scale of 1 to10, to what extent did you feel as though you couldn't bend your arm? / 10

5. Hand Repulsion

You were then told that your hands were moving apart because they were repelling one another. Would you say that your hands felt as though they were moving by themselves or did you move them on purpose? (score involuntary) 0 / 1

On a scale of 1 to 10, to what extent did your hands feel as though they were repelling one another? / 10

6. Music Hallucination

You were then asked to imagine a piece of music. You nodded your head to show that you could hear the music. Did you have to create the music on purpose or did it play by itself once it was started? (score latter) 0 / 1

On a scale of 1 to 10, to what extent did you feel as though you were listening to real music? / 10

7. Arm Immobilisation

You were then told that you couldn't lift your arm because it was so heavy. You didn't lift your arm. Did you feel as though you *couldn't* lift It or would you say you didn't lift it to go along with the test? 0 / 1

On a scale of 1 to 10, how heavy did your arm feel? / 10